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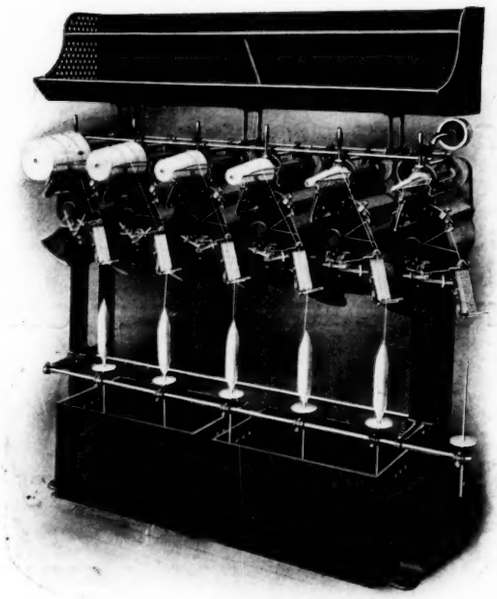

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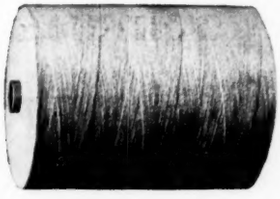

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COTTON

PUBLISHED MONTHLY

Vol. 77, No. 4 FEBRUARY, 1913.

PUBLICATION OFFICE
DALTON, GA.

EDITORIAL and ADVERTISING DEPARTMENTS
GRANT BUILDING, ATLANTA, GA.

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SUBSCRIPTION RATES.

Domestic .....$1.00 for Two Years
Foreign .....$1.50 Per Year
Canada .....$1.00 Per Year

Complaints of failure to receive Cotton regularly or of errors of any nature relating to subscriptions should be promptly made to the Atlanta office.

Orders for any change in advertisements must reach Atlanta previous to the 10th of the month preceding month of issue, otherwise publishers cannot be responsible for changes.

Entered at Dalton, Ga., Postoffice as Second-class Matter.

CONTENTS.

Editorial—
Labor and Wages 131
Vote on the Question of a National Budget..... 133
Scientific Positions as Political Assets 133
Good Manners Prevent Strikes 134

General—
Benign Protection 135
A Review of the British Cotton Trade for 1912..... 138
How to Sample Coal 140

Mill Conditions and Market Reviews—
Southern Mill Situation 142
New England Mill Situation..... 143
Cotton Crop Conditions and a Review of the Market..... 144
The knit Goods Market 145
The Yarn Market 146

Cotton Manufacturing—
Causes of Defective Yarn and Roving 147
The Weaving of Seamless Felts for Paper Makers..... 151

Knitting—
Influence of Twist on Yarn 153
Artificial Silk, Its Manufacture and Uses..... 155

Dyeing, Bleaching and Finishing—
The Value of Commercial Starches for Cotton Mill Purposes 158

Practical Problems Discussed by Cotton's Readers.....162
New Machinery and Trade Notes 165

LABOR AND WAGES.

Significant unanimity is found on the proposition that labor constitutes the chief problem of the cotton manufacturer. Mechanical processes have been so definitely standardized, and manufacturers of equipment have gone so far in perfecting their product that as far as machinery is concerned the textile manufacturer is probably in a somewhat better position than his conferes in other lines of manufacture. These are perhaps newer, and consequently the matter of special machines has not been worked out to the final and perfect stage.

If the operator of a cotton mill could wipe off the slate all the troubles and worries and petty vexations that flow from the one big question of labor, his position, while perhaps not ideal, would be advanced a good many steps in the direction of the millenium. But labor problems are present and pressing, important and seemingly inevitable. The human factor is almost the "X" of his business equation.

Securing good and permanent help is the chief question that pertains to labor. Achieving the *summum bonum* of having employees take an intelligent interest in what they are doing, mastering the machines they are in charge of, and then sticking to the appointed task as steadily and persistently as do skilled workers in some other lines of endeavor, is the goal toward which the efforts of owners, agents, superintendents and overseers are bent. The fact remains, however, that in a great many cases the employer has to confess that he not only has insufficient help, but that what he does have is far below the standard of 100 per cent efficiency.

And the arbitrary symbol of 100 per cent does not mean the greatest possible amount of labor, nor the highest possible development as to technical ability; but simply what, under normal conditions of intelligence, strength and interest, an employer has a right to expect of those from whom he is buying labor. Obviously, then, the present system of handling labor is wrong, or else it must be admitted that the general character of the labor attracted to the mills is not of a type capable of development in the right direction.

The latter horn of the dilemma is hardly the logical one, for the reason that in the Southern mill, at all events, the manufacturer gets a grade of native labor probably unsurpassed by any other section and which, when directed into other channels, appears to serve with general satisfaction to the employer. Assuming that it is not of the highest possible type, it must be admitted at the same time that it is flexible, capable of being educated, and potentially, at least, generally efficient. What, then, of the system under which it is handled?

It is a basic law of economics that values, like water, tend to seek their own levels. Offer a given price for any commodity in the industrial world, from cotton to fabrics, from boots to balloons, from legal advice to labor—*and you get just about what you pay for.* You don't expect to get a "Packard Six" for the price of a "Ford Model T," nor a high-grade woolen suit for the price quoted on shoddy.

Yet, in entering the labor field, employers sometimes expect to buy high-grade goods in this line without paying the market price offered for that particular class of service. Advertisements are often seen offering $1.75 to $2.00 per day for the services of a master mechanic, who is supposed to not only possess the requisite knowledge to adequately repair all classes of mill machinery, but also to take active charge of the power plant with a cross compound, condensing engine and its accessories. As one Southern manufacturer says, "So many mills base their production cost on 75 cent card hand labor, when it would be far more economical to base it on $1.50 card hand labor."

But it must be conceded that the cotton manufacturer, like other members of the textile trade, would be willing to pay as much as his employees are worth to him; to give them all that they earn. As a matter of fact, a great deal of money is spent in educating beginners in the mill, and they draw out of the business a far greater amount than they put into it. Hence, to all appearances, the average mill man is going as far as possible in the direction of giving his employees the fair return for their labor to which they are entitled, and which, it would seem, would result in producing a much more efficient class of labor.

That is the surface view. Look a little more closely, and consider this question: Is the manufacturer using the system of payment which is designed to develop the greatest amount of intelligent interest, pointed out above as a necessary prerequisite to the right kind of results? To put it even more plainly, is the usual day wage system of remuneration the best possible plan of payment that can be devised? That might be called a purely rhetorical question, for in view of the general situation which prevails the obvious answer is, no.

It is a peculiar fact that although a system of payment based on production has been found to be the best possible plan in nearly every other line of work, the textile interests have been slow to take it up, and have clung to the day-wage idea with a tenacity hardly justified by the results of their previous experience with it. The willingness to try something new, which is found in connection with mechanical appliances, as a general rule, is strangely absent from the mental attitude of those who have had occasion to consider a change in the methods of labor compensation.

Yet, in a number of large plants where it has been in use for a sufficiently long period to enable the plan to be tested, the success which has been recorded has been sufficiently impressive to convince the most skeptical. Here is the experience of a large spinner in an Ohio Valley city, who adopted the piecework plan of payment, not basing the returns to the operative on the number of sides tended, but on the number of pounds produced, so that actual production, and nothing else, was considered. The average wage paid in the plant prior to the adoption of the system was something like $1.50 a day. Today it is higher than that, while many of the skilled operatives are earning from $2 to $2.25 a day. The number of employees who have come to the plant and left it has been greatly reduced; in other words, the personnel of the factory force has become more permanent. The employees are satisfied, because they are earning more money than they did under the old system; and the heads of the plant are pleased, because they are getting better results from their expenditure for labor, and are having less trouble on acount of the necessity of finding new help to replace those who quit.

That this last is a highly important consideration is indicated by the experience of a Southern sheeting mill, which at last reports had only about 75 per cent of the employees it needed to operate its plant full time. Yet during the past twelve months it has had on its payrolls, at one time or another, over twice as many hands as would enable the mill to be run full capacity. The answer is plain—those who came to learn refused to stay.

This is not alone important from the standpoint of overpayment for the labor put in during the period of learning, though as a matter of fact paying a beginner around 75 cents a day during that time is a costly operation for the manufacturer, who, it is certain, does not realize nearly that much from the production of the learner; but it is equally true that the efficiency of the equipment is greatly reduced, and the problem of earning enough to pay a fair investment charge on machinery that is operated at only a small percentage of its normal efficiency is no slight one. Power is wasted, machines are idle (as far as actual production is concerned) a large part of the time, and the overhead expense is greatly increased—simply because a large percentage of those employed in the mill are not sufficiently skilled to run the machines at a fair rate.

Thus it is plain that the solution of the labor problem depends chiefly on securing permanent labor that is sufficiently skillful to produce approximately 100 per cent of productive efficiency from the machines they operate; and securing this permanency of occupation hinges chiefly on making the remuneration sufficiently large to hold this labor in place, against the competitive influences of employment in other branches and domestic labor. Under the piecework system the capacity of the operative is not increased, but her interest is stimulated by the possibility of earning more; there is a smaller margin between actual production and possible output; and the two more nearly coincide as the skilled worker, seeing the opportunity to reach a figure that would never have been touched under the old day wage system, concentrates all her energies upon making each spindle or machine she is tending produce the greatest possible amount of finished product.

Unless you can awaken ambition, furnish incentive and provide the mental exhilaration that comes from a contest—in this case the operative against the machine—the production of each unit of the equipment and each unit of the labor organization is not going to reach its maximum. When you do provide these factors, output is certain to go higher, and successful direction of labor is much more likely to be realized.

When a mill is operated by skilled employees, who have been in their places long enough to have become thoroughly acquainted with their duties and the possibilities of their machines, the production per machine is much larger than when beginners or those who have only gone half the way toward the position of experts are employed. That means that the mill with a labor force of the right kind can turn out a given production with a much smaller investment in machinery than when it is forced to man its equipment with the undesirable type of worker. When it is necessary to earn dividends on a capital investment represented in machinery which is running below its normal possibilities as to production, you have an initial burden which all the arts of management and salesmanship can hardly overcome.

In a Georgia mill where the piecework system of spinning was adopted, earlier investigation showed that on the day wage plan the average machine production was practically 80 per cent of its real capacity. When piecework rates were inaugurated a gradual improvement was noted

through succeeding weeks until a new high average was reached and 92 per cent of possible production established; a spinner's earnings increasing in the meantime from $8.65 per week to $9.55 per week.

On another class of yarn in this same mill on which 100 per cent production would be 54½ hanks per week, the actual production on the "side" basis was 44 hanks per week, or 80.7 per cent, while the actual production under the "hank" or piecework basis was 47 hanks per week, or 86.2 per cent production. The spinner's pay on the side basis was $7.90 per week and on the hank basis, $8.75 per week.

The increased production in this particular mill resulting from the adoption of the piecework system allowed the changing over of 14 frames onto another class of yarn. It showed a net saving of $27.35 a week in actual labor on spinning. It made a saving in doffers' wages of $9.60 a week and at the same time increased doffers' wages 40 per cent, or to an average of $1.40 a day.

A well-known agent of a large Southern mill, who has tried out this piecework proposition, said recently that he had decided to try still another plan in the development of the piecework idea. This was to contract the work to the spinners, allotting them as many machines as they could handle satisfactorily and allowing them to hire their own assistants, including doffers.

A further indication of the intimate relation of wages to labor and production is shown by the results at another mill. Ten years ago a new mill was built and began operation. That mill today with its machinery now ten years old, making the same goods and selling them to the same customer, has during this period reduced the working hours 10 per cent; increased wages 40 per cent; and increased production 33 per cent. The difference between the price of the raw material and the price of the finished goods has in the meantime been greatly reduced. The poundage cost has slightly increased, but this increase is more than compensated for by the decrease in the amount of "seconds."

In planning the installation of a piecework system, a good many factors are to be considered. First, there is the question of the average production of each type of machine under present conditions. Then it must be determined how far above that is the production of the machine, operated at what should be considered a normal rate. Care should be taken not to adopt a plan which would require undue speeding of the operatives in order to get a production sufficient to result in the wage formerly enjoyed; but it can, in nearly every case, be put at a figure which will require somewhat more energetic efforts than were formerly put forth. This results, usually, in the employee actually thinking about her work and how to increase output, and for the first time makes her interests and that of her employer actually, as they have been nominally, mutual.

When the piecework system is in effect, the labor expense of a given lot of goods can be figured to the fraction. Without it, that element of cost is always uncertain and variable. In these days of cost-accounting and accuracy in figuring expense pertaining to production, such a knowledge of labor is a tremendous advantage, enabling the manufacturer to determine how far he can go in fixing his quotations. But it is only one of the numerous benefits flowing from the use of a piecework system carefully and intelligently installed, rightly lived up to and adapted according to the individual needs of the mill.

VOTE ON THE QUESTION OF A NATIONAL BUDGET.

The question of the plan for a national budget was submitted to referendum in the Chamber of Commerce of the United States of America on November 30, 1912 and 45 days were allowed to the constituent members in which to consider the question and record their vote. The time expired on January 14, 1913, and the vote has now been canvassed and made public by Elliot H. Goodwin, general secretary.

This vote complies with the provisions of paragraph 2 of Section 4 of Article X of the By-Laws and is binding upon the Chamber.

Copies of the Referendum were sent to a selected list of organizations not affiliated with the Chamber with a request that they record their opinion in order that the vote might be more fully representative of business opinion in all parts of the United States. Twenty-eight organizations casting 63 votes availed themselves of this privilege.

The total vote of all organizations that took part in this Referendum is given in the following table. Each association is entitled to votes from 1 to 10 in accordance with the number of its members.

Number of organizations voting	152
Number of votes cast	583
Number of votes in favor	573
Number of votes opposed	10
Number of States represented	34
Divisions other than States represented	District of Columbia and Hawaii

The only states not represented by organizations voting on this question were: Alabama, Arizona, Idaho, Montana, Nevada, New Hampshire, New Mexico, Oklahoma, Rhode Island, South Dakota, Tennessee, Utah, Vermont and Wyoming.

SCIENTIFIC POSITIONS AS POLITICAL ASSETS.

(*By Our Washington Correspondent.*)

In the political arena, "To the victor belongs the spoils." To some extent, however, our government has wisely changed this ancient doctrine, as evidenced by the Civil Service, and the merit system of promotion. But with the advent of a new administration many officials are changed because of political aspirations, and without due regard to their experience and value. Many of these officers should not be disturbed, for obviously their training and knowledge gained through past experience is of vital importance to the public, and indeed to the incoming administration, and for these reasons certain official places at least should be exempt from politics.

A notable illustration is that of the United States patent office. If a competent and efficient man be found filling the office of Commissioner of Patents, and one whose office has prospered under his administration, why displace him solely on the ground of politics?

The business of the Patent Office has been so judiciously handled in the last seven or eight years that it would amount to a national calamity to disturb the present executive head of this important bureau. The inventor's interests have been carefully safeguarded; the salaries of its employees

increased; and efforts instituted which bear promise of successful fruition in the near future to secure a new building of modern construction adapted to the needs of that important and growing bureau. Treaties of great value to the Patent System have been entered into with foreign countries, and for the first time in the history of our government the Congress has been brought to a full realization of the importance of the Patent System to the people of our country, as well as to the necessity for the exercise of the proper fostering care of that system in the granting of the requisite facilities to the Patent Office in the administration of the laws enacted for the carrying out of the same.

These results have been accomplished by the present head of the Patent Office. If he be supplanted, this work of reform will be halted, if not entirely abandoned. His successor of necessity would not be familiar with the difficulties experienced by the present incumbent in securing the results already accomplished, as well as the progress made in the obtaining from Congress those things necessary, such as the proposed new building, the further increase of the salaries of employees, and the provision of adequate force to efficiently handle the work. Are the important interests of the inventors of the country, so dependent as they are on a proper administration of the Patent Office, to be endangered merely because of a change of administration and the desire to reward some aspirant for office, thus making this important bureau, with its vast commercial ramifications, the foot ball of political preferment?

A wise patriotism must give an emphatic negative to such a proposal. The Patent Office of necessity differs in its scope from other bureaus of the Government. It is scientific in its nature, and includes among its employees many men who hold degrees from the leading universities and technical schools, whose salaries are not commensurate with the service which they render, and as paid by outside interests.

The Patent Office has always been a self supporting institution, the fees received from the inventors has steadily increased, until today the balance in the Treasury to the credit of the Patent Office amounts to more than seven million dollars.

Never in the history of our Patent Office system have the conditions been so favorable for efficient service and future improvements, and this is largely due to the efforts of the present Commissioner of Patents.

Because of interests involved, and the technical knowledge required, what advantage would be gained by deposing an efficient government official to make place for an inexperienced aspirant for office.

It has repeatedly been suggested in the House and Senate that this particular bureau should be entirely removed from 'politics, for every member of Congress is made the bureau of complaint for such of his constituents who have criticisms to make of neglect of their individual interest by any bureau of the departments in which they may have pending matters. Congress is thus the barometer which shows a satisfactory and just administration of this particular bureau and one which has caused a complete absence of complaint, or criticism relative to the work thereof.

The present high standard of efficiency in the Patent Office is due largely to the fact that the higher officials, including the present Commissioner, are the product of the office. These men have risen from the ranks and know the necessities of the Bureau, which makes it all the more essential that a broad view be taken of the entire matter, and insist that this office is strictly a non-partisan one.

The country is to be congratulated, and this without regard to divergent political views of our citizens, on the fact that President-elect Wilson is not a spoilsman in the political sense of that term, and his public utterances give evidence that his mind is directed more to the higher measures affecting the public weal, such as the tariff and the trusts, than it is to the spoils of political victory. He realizes that to the great number of our citizens these national questions mean more than does the fact that one individual is supplanted in office by another.

We confidently believe that after he shall have successfully determined these greater questions, and taken up the question of changes in office, he will be found with an open mind and disposed to realize the importance of the Patent System, as well as the danger of disturbing existing conditions, which have brought such system to its present high standard, and which if undisturbed give bright promise for its future.

GOOD MANNERS PREVENT STRIKES.

The development of the corporation, with its impersonal machinery, has made this question of personal contact a difficult one. The International Paper Company, which has just passed through a series of strikes, has attempted to reach the men by an industrial engineer, who devotes all his time to keeping in touch with the men.

That is really the gist of the situation; this personal equation. Any manager of a year's experience knows how difficult it is to get shop foremen. The best workman does not always make the best foreman. It requires personal endowments that are above skill; the "capacity to handle men," we call it. But it really is the capacity to use men without handling them.

Here is an illustration told by S. E. Heberling, president of the International Switchmen's Union: "A few years ago a big strike occurred in the Northwest. It was really brought on by two men who were temperamentally out of tune. The switchmen's committee finally arranged a meeting with the railroad officials' committees. Now the heads of these two committees clashed, neither exercised the diplomacy the occasion demanded, neither acted as a representative should act, and a strike followed."

The average man needs personal recognition and the average employer is too apt to overlook this basic trait. Many a man joins a union through his craving for fellowship, and he knows the employer and the foreman are only human beings like himself.

This is what Henry Abrahams, secretary of the Boston Cigar Makers' Union, meant when he related his experience in adjusting a dispute which recently threatened a Boston shop with disruption. "I found the men in a discontented mood. Not over wages or hours, but over something the boss had neglected. So I went to the employer and told him to say 'Good morning' to the boys when he came down to the shop. He looked at me in surprise. He supposed his duty was done when he complied with the law and paid the wages. A personal kind word is a cheap remedy for half the trouble an employer has with his men."—*World's Work* for February.

BENIGN PROTECTION.

More About the High Cost of Living—The Cause and Remedy—The Competitive System and Socialism—It Is Only by the Elimination of Waste Labor That Labor as a Class Can Come into Its Rightful Inheritance.

(Contributed to COTTON)

BY FRED W. SIMONS, EX-PRESIDENT NATIONAL ASSOCIATION OF HOSIERY AND UNDERWEAR MANUFACTURERS.

CHAPTER 5.

(Copyright by the Author).

I wish to express my appreciation of Prof. King's attitude and as I can assure him not only of good will but also of high personal esteem we may each fire away without danger of doing any damage except to the theories advanced by the other.

Yes, I am glad to learn that the political economists are teaching some truth, but they have an awful task before them if they expect ever to compensate the world for the damage they have done by propogating the free trade theory. It took me twenty years to find my way out of that maze of sophistry even after I was convinced that it must have a fatal defect somewhere. I fear that I have not yet quite forgiven them for misleading me, which fact may have led me to criticise them with undue severity.

This, however, is not so bad as too much leniency, so for good measure and to make sure I don't err in the latter way, I will add in response to Prof. King's remark that "Mr. Simons apparently takes the position of the typical business man who has no use for theory any way," that insofar as speculative theory is concerned, he is correct. I find such theory too frequently at variance with fact, and experience has taught me that when fact and theory are at variance there is generally something the matter with the theory. I have a great deal of use, however, for that kind of theory which consists of a clean-cut statement of facts and a wise and broad interpretation of their significance.

The trouble with our Savants is that they are theorists only, their very erudition seems to have a tendency to disqualify them for the consideration of practical questions. It is doubtless true, as the Professor says, that their theories are "formulated only after careful and exhaustive study by many men who have devoted years perhaps to this particular problem," but they lack the invaluable, I had almost said indispensable, aid of physical contact with the elements out of which they must construct their theories. The result is that they deduce from deductions and build theories out of theories, without verifying the facts upon which their original theories were predicated; consequently when they make a mistake there is nothing to bring it home to their consciousness with adequate forcefulness, and it stays with them.

I cannot agree with the Professor when he says that while my definition of political economy is sufficiently correct for practical purposes, yet "it does not necessarily follow that the business man is the one best fitted to work out the science of business." I hold that the men who are best able to plan and carry out great business projects for their own benefit are best able to do the same thing for the general welfare, and further, that they don't have to quit doing the former in order to do the latter. It is quite true that "in this day of specialization the man who succeeds in business has little time to devote to the general problems of business from the social standpoint," but he must take time to do it. It is his job, and it is his job because he of all men is best qualified to perform it.

I am of opinion that the sociological student, even if he specializes in political economy or any other branch, can best serve his day and generation by gathering and truthfully presenting facts and conditions rather than by formulating theories. He is perhaps well qualified to tell the man of affairs what the welfare of society demands, what must be done—but not how to do it.

Perhaps I can best make my position in this matter clear by quoting from Thomas Carlyle, who fully realized his own limitations in this regard. He says:

"For the rest, let not any Parliament, Aristocracy, Millocracy, or Member of the Governing Class, ask again with the least anger, of this Editor, what is to be done, how that alarming problem of the Working Classes is to be managed? Editors are not here, foremost of all, to say How. An Editor's stipulated work is to apprise thee that it must be done. The 'way to do it' is to try it, knowing that thou shalt die if it be not done. There is the bare back, there is the web of cloth; thou shalt cut me a coat to cover the bare back, thou whose trade it is. 'Impossible?' Hapless Fraction, dost thou discern the Fate there, half unveiling herself in the gloom of the future, with her gibbet-cords, her steel-whips, and every authentic Tailor's Hell; waiting to see whether it is 'possible?' Out with my scissors, and cut that cloth or thy own windpipe!"

The quotation is from Carlyle's "Past and Present," and the Professor may regard that volume as one of the textbooks I "would deign to preserve." Of scarcely more than pamphlet size, it is of more value as a beacon light than all Adam Smith or David Ricardo or John Stuart Mill ever wrote. True, Carlyle builds no structure, nor pretends to build any, but he lays a foundation, or rather calls attention to a foundation laid from eternity upon which we builders persistently refuse to build.

I must ask the Professor's permission to continue using the word "value" in its commonly accepted sense, for several reasons, one of which is that I don't wish to be deprived of the use of the word in that sense, but shall have no need during this discussion to use it as defined by him.

The Professor will please call to mind that he said he would endeavor to present his case "in such a form as to be intelligible to the man who is not versed in the terminology of Political Economy." I am not accustomed to think in technical terms and should probably find the effort to do so confusing; perhaps some of our readers might find it so, too. Moreover, I cannot take the Professor seriously when he protests that he does not know the meaning of the term "intrinsic value," and greatly doubts if it has any clear meaning. I explained what I meant by it when I used it.

Both words are in common use singly and in combination; they may be found in any standard dictionary, and Noah Webster uses the term "intrinsic value" to illustrate the application of the word "intrinsic."

The Professor is simply sparring. I dearly love an argument myself, and like to win, of course; but in this case I am not seeking wrangler's honors; I am seeking an opportunity to present what I believe to be the truth upon a subject of great importance, and I thank the Professor for his criticisms, which aid me greatly. I will not wilfully misconstrue any argument that he may set forth. I will endeavor to grasp the full meaning of his every expression; will weigh it conscientiously and will not contend a moment against what seems to me to be true. I ask the Professor to govern himself accordingly, and I am sure he will do it.

I would like to stop "quibbing about words" right now, and "get down to brass tacks," as the Professor has suggested, but I can't let him get away unchallenged with the contention that the merchant is just as much producer as the farmer or manufacturer.

Of course, there is a sense in which the merchant produces his goods. He produces them when he takes them off his shelves and hands them to his customers; but there is a distinct and very important difference between the sense in which the merchant is a producer and the sense in which the farmer and the manufacturer are producers.

The latter make what they produce; create what they produce, if you please. The farmer makes or creates the potato; the watchmaker creates or makes the watch; the tailor makes or creates the suit of clothes. They don't make or create the elements or substances out of which those commodities are constructed, but they change the form of them and make or create the potato, the watch and the suit of clothes. If this distinction is still too obscure to be recognized, let the Professor take into consideration the fact that if the farmer and manufacturer were producers only in the same limited sense in which the merchant is a producer, there would be absolutely nothing procured.

The merchant's calling is as honorable as that of the farmer or manufacturer and his services are indispensable, but there is a difference in the functions he performs of sufficient importance to demand distinct terms to indicate them. To the ordinary individual, the farmer and the manufacturer are producers and the merchant is a distributor, and the political economists are not going to clarify their own mental vision or the mental vision of anyone by obliterating the distinction.

The distinction in question is more than important—it is vital, and a recognition of it is indispensable to a correct understanding of the causes which have produced the high cost of living phenomena and equally indispensable to the formulation of any efficient remedy.

I have before me at the present time a copy of "A Study of Trolley Light Freight Service, and Philadelphia Markets in Their Bearing on the Cost of Farm Produce," by Clyde Lyndon King, Ph.D., Wharton School of Finance and Commerce, University of Pennsylvania, "made under the direction of Rudolph Blankenberg, mayor of Philadelphia," and published October, 1912. Perhaps the title sufficiently indicates the purpose for which the investigation was made. I find in this report a "table giving the price received by the producer and each middle man and the per cent of increase of each price over the preceding price, together with the total increase of consumers' prices over producers' prices." Out of thirteen articles enumerated, the one showing the smallest increase is high-grade eggs at 67 per cent, and the one showing the largest increase, low-grade live poultry at 266 per cent, the average for the thirteen articles being 136 per cent increase of consumer's price over producer's price.

I have before me also a copy of "The Incomes of American Families," by E. Dana Durand, director of census, in which Mr. Durand states that the average working man's family in this country expends approximately 52 per cent of its income for food and fuel, 12 per cent for clothing, 18 per cent for rent and the remaining 18 per cent for all other expenses.

Now, if the people as producers sell the products of their labor for half the price they pay for them as consumers, what—Oh well, what's the use? The high cost of living problem is altogether too intricate for solution, joint committees of Congress having failed in the attempt, we now demand an international commission of inquiry.

In fairness, however, we must admit that the government has had thrust upon it for solution problems that do not properly belong to the domain of statesmanship. The "high cost of living" is not a problem in government, but a problem in business, and it would never have assumed the proportions of a serious national problem at all, except for the defective business methods to which it owes its origin. We frequently hear it said and with much truth that we need business men in Congress, but it is equally true that we need statesmanship in business. By that I do not mean that the government should interfere unnecessarily with business, but that business men, and especially those business men of dominating genius, who so largely determine the form that business shall take and the methods that shall be employed, should carefully study their chosen methods and endeavor to discern what will be their ultimate effect upon the welfare of the people. That is what I mean when I say that we need statesmanship in business.

I am satisfied that no class of men in existence are more straightforward and honorable than our great business men and captains of industry, but the "square deal" is not sufficient if the tendency of the methods employed is to bring about such conditions as at present obtain; and I think they themselves would be the first to admit that if existing conditions are the result of the business methods now in use then there is something wrong with the methods.

The high cost of living is for the most part the result of an enormous and steadily increasing cost of distribution, which in turn is the result of bad business statesmanship in following the line of least resistance in securing business without taking into consideration the ultimate effect of the policy pursued upon the public welfare and so upon business itself.

The remedy is to cut the cost of distribution in half, giving the people the benefit of the reduction, thereby enormously increasing their purchasing power and creating a demand for labor in the fields of production that will absorb the superfluous labor it will displace in the fields of distribution.

Impossible? O well, then; no radical cure is possible, and we are destined to witness a steady contraction of human liberty and freedom as the result of the continual encroachment of an utterly impractical socialism.

There is a new field of enterprise, a new kind of business awaiting exploitation; the business of seeing to it that when the people buy merchandise they don't pay for anything else. The margin is ample and the field unlimited, and

the only reason that I can imagine for the fact that it has escaped the vigilant eyes of our great business men for so long is that they have been too busily engaged promoting production and developing the natural resources of the country to notice the mischief we have been doing with our tin horns and wax-work shows.

If the means to a given end are properly applied, the end will be accomplished, will it not? To state the question is to state an obvious truism. No well-informed person can seriously doubt the ability of the civilized world with its modern implements and methods of production to supply in superabundance every commodity necessary to the maintenance of a better and more comfortable standard of living than has yet been attained, for every single individual; and that without the necesity for the deadly strenuousness that is eating the soul of civilization.

The means exist but the end is not attained, and the end is not attained because the means are not used to attain the end—not used with that end in view. The system of unlimited competition for which we clamor so vociferously and so persistently makes no provision for supervision of the whole; it assumes with fatal inaccuracy that if every individual does the best he can for himself the best interests of the people as a whole will be served. It imposes no obligations beyond the letter of the law, and as Carlyle told us seventy years ago, it has not enough virtue in it to keep it from going rotten.

We are told that the competitive system is breaking down, and that the policy of "every man for himself and the devil take the hindermost" will not bring about the best possible conditions for the people as a whole; there being too many hindermost.

We are told on the other hand that we must either have competition or state socialism, otherwise monopoly will "enslave" us; and we proceed to lambast the ablest business men we have, "busting up" trusts, monopolies, magna charters and constitutions indiscriminately.

The competitive system has broken down in so far as it has failed to bring about the best possible conditions of society, and it will remain broken down so long as it stands only for utter selfishness. It imposes no obligation upon any one to protect the public interests and the public welfare and it places every man in conflict with the body politic. State socialishm would do precisely the same thing and destroy human freedom into the bargain.

After all nothing but a superficial knowledge of economic questions can be gained if we leave out of consideration the human factor; if we fail to note the best progress and present position of mankind in the intellectual and moral as well as in the physical material sense.

In the last analysis the high cost of living predicament in which we now find ourselves like most other troubles that overtake us is the result of our own cussedness; not alone the cussedness of the men upon whom we are trying to saddle the responsibility, but the cussedness of "We, the people."

The public thinks it needs protection against its most successful business men and it is seeking to obtain it by the enactment of laws; what it really needs is protection against itself at the hands of its great business men, who are perhaps alone able to extend it.

It is not possible to enact laws specifically prohibiting every kind of meanness that human nature is capable of, and if it was it would be impossible to enforce them. Moreover, every one is already prohibited by the decalogue. What we really need is a higher moral standard in business; a standard that will prompt the seller to protect the buyer instead of fishing for him with a costly bait and charging him with the bait.

That of course is about tantamount to saying that we will be all right when the millenium arrives. But we can't wait for the millenium, which will probably arrive on the installment plan, and we may depend on our great business men to lead us out of our present troubles—if we allow them to stay out of jail. If they don't do it because of the moral obligation resting upon them they will do it because it is to their interests to do it. Then we will proceed to get into some other troubles and so on until we learn to do things from a proper motive.

The competitive system is incomplete in that it makes no provision for supervision of the whole. There is no guiding hand, no supervising intelligence, either individual or collective, to direct the energies and activities of the people to the accomplishment of the end for which, primarily, they are expended—*viz.*, the progressively comfortable subsistance of the race. This deficiency results, as I have endeavored to point out, in an appalling waste of effort. Our individual enterprises are superbly managed, but efficiency terminates in the counting room and the balance sheet is the end of all things. The companies and regiments of our working armies are superbly trained but instead of fighting as allies for the subjugation of chaos, they are fighting each other—and the result is chaos indeed. A state of civil war exists in our economic life and we are devastating our own domain and trampling as spoils the fruits of our own labor, and the public foots the bill in the shape of "high cost of living." That's the way all war bills have been paid in the past, and will be paid in the future—ever more, Amen.

"Yes, I like a little competition," said Mr. Morgan, "but I like combination better." No wonder! Yet the competitive system is necessary in order to preserve the individual freedom of action without which liberty cannot exist, but the competitive system is without moral quality good or bad, and will work beneficially or injuriously as we may elect. At present we elect that it shall work injuriously. The thing to do is to supply the deficiency and provide for "supervision of the whole." We have captains of industry and merchant princes and kings of finance, but we have no field marshalls, no commanders-in-chief, no one to see that all the various forces are working together for a common end. As yet we don't even see the necessity for such supervision—but was ever any great enterprise accomplished without it?

Nor is it possible that any such enterprise can be successfully carried on by the government. It is to our great business men and not to our government that we have a right to look for a remedy. The men in command cannot escape this responsibility; it is useless for them to protest that they are not in supreme command; they are the supremest commanders we have. But as I have said these men have been very busy promoting production and developing the resources of the country; no doubt when we get through "investigating" them and give them a chance to take stock of conditions they will realize the obligations their ability and resources impose upon them and take up the task of eliminating waste in the distributive processes as they have already done in the productive processes.

The elimination of waste labor is the only remedy for Socialism, the only thing that will permanently check its growth. Socialism is really a product of the terrific struggle for existence experienced by the world's workers under the present industrial system; it attributes about all the troubles there are in the world to competition, and its avowed object and purpose is to overthrow the competitive system. How then can competition be the antidote for Socialism?

The Professor says he is "heartily in accord with Mr. Simons in admitting our debt to the Socialists for their part in pointing out the wastes of competition," but he never caught me in the act. My knowledge of the wastes in question is first hand knowledge gained by observation and experience in business. I am willing to admit that the Socialists know more about the troubles, trials and tribulations of mankind than anyone else—but they don't know "the way out."

It is only by the elimination of waste labor that labor can come completely into possession of its own; waste labor is labor's loss; nor is it capital's gain; it is no one's gain; it is absolute loss and it falls on labor. Mr. Roosevelt says he wants to see labor get a larger share of its products, but how can it reap products where there are no products? No, the merchant is not just as much a producer as the farmer or manufacturer—and the fact is important.

A REVIEW OF THE BRITISH COTTON TRADE FOR 1912.

Extracts From a Compilation by The Manchester Guardian.

When the year opened it found England in the throes of a formidable labor struggle which lasted till toward the end of January; during February and beyond there was a general strike in the coal industry which brought a great deal of suffering and much dislocation of trade; the problem of wages in the ring-spinning industry was formidable during the summer, and a dispute on the subject of compensation for injuries in a spinning mill became a menace to the industry in the autumn; the differences over "bad spinning" have been with them all the year, and are answerable for an attack on the Brooklands Agreement, in the meantime they have had two European wars; but in spite of it all the cotton trade has had an excellent year.

No doubt manufacturers suffered losses from the lock-out, which had, too, the effect of reducing spinners' margins, which were improving, but the industry has shown an extraordinary power of recuperation. They now seem far enough away from those recurrent agitations in favor of short time in the spinning trade, for the two branches of the industry seem to have reached something like a balance; it is frequently asserted that the increases in looms which are still going on will soon give the advantage to the spinners. It is very remarkable that the spinning mills about which all were so deeply concerned a few years ago should have been so soon assimilated into the industry; the forces which produced them may have been blind and those who shaped the enterprises rash, but without such rashness Lancashire could hardly have taken her great share in the expansion of the cotton trade. Fortunately there has been a strong demand for export yarns, and this, added to the great demand from home manufacturers, has placed spinners in a strong and improving position. Even now they are not doing as well as manufacturers generally, and among the manufacturers considerable difference must be recognized. Such a vast trade as that of Lancashire can never be evenly good or evenly bad, but there is no doubt about the general character of the year or of the generally favorable prospects.

The annual statistical record prepared by John Kidger, of Oldham, indicates that the result of the year—commonly taken as ending with November 30—is the best since 1908 in the spinning trade. Mr. Kidger takes 100 companies (not all the same companies as he took last year, though "for the purposes of averages the situation is unaffected"), and he finds that these have earned £15. 6s. per cent for 1912 on the paid-up share capital, against 15s. 11d. per cent for 1911. The dividends paid have only amounted to 7 1-5 per cent, but this is because of the prudent policy of the directors, who have greatly strengthened their reserves. This mean average of 7 1-5 per cent compares with 4 3-5 per cent in 1911, in which year, of course, a considerable call was made on reserves. Mr. Kidger calculates that the year's profit on the combined share and borrowed capital works out to a profit percentage of £10. 16s. 1d. Of course there is no selection of specially prosperous mills, nor of those in a particular section of the industry, and the irregularities of the trade are suggested by the fact that twenty-five out of the hundred did not declare a dividend. Mr. Kidger makes a further list of 110 companies which do not publish their profits, and these have paid a mean average dividend of 9 per cent against 6 per cent in 1911.

Another analysis of stocktaking results made by William Tattersall shows that out of 74 companies only one made a loss on the year's working. The profit on the share capital is 12.7 per cent, as compared with 1.06 per cent last year. On share and loan capital combined the profit is 8.65 per cent, as compared with 0.71 per cent in 1911.

A further list published by the Lancashire Shareholder's Association indicates that 153 companies, employing approximately £8,596,212 as share, loan, and mortgage capital, paid about 5¼ per cent on this combined capital. The 67 companies which issue balance-sheets earned 9¾ per cent on their gross capital.

A good deal of interest has been taken in the question of cloth contracts, especially in their relation to strikes and lock-outs, and at the beginning of December the Chamber of Commerce and the Cotton Spinners and Manufacturers' Association issued a circular in which they jointly recommended the insertion of a clause to give manufacturers some measure of protection from the penalties attached to non-delivery through *force majeure*. The question is complicated by the want of uniformity in the Eastern and other contract forms, and possibly some further development may occur during the coming year.

On the whole the working results of the great industrial concerns in which Lancashire takes particular interest have confirmed the estimates of general prosperity, though there was some disappointment with the balance sheet—issued in August—of the Calico Printers' Association, which nevertheless maintained its dividend at 3 3-4 per cent as in the previous year. The Bleachers' Association increased its dividend from 4½ to 5 per cent for the year ended March, and since then bleachers have been busy enough to assure a continuance of prosperity. Frequently during the year, and in some cases, persistently, the pressure on the bleachworks has been so great that merchants have not been able to obtain their goods in "reasonable" time, and this

delay in bleaching and finishing has now become a formidable consideration in the financing of stock. No doubt the Association is reluctant to extend works that might be considered sufficient for normal times, but a continuance of trade in its recent volume must make an effectual demand for increased accommodation either inside or outside the Association.

Egypt has received two visits from Lancashire deputations interested in the development of cotton-growing there. That from the British Cotton-growing Association early in the year took a particular interest in the possibilities of developments in the Sudan. The subsequent visit of the International Federation may fairly be regarded, too, as a useful stimulation to one of our greatest sources of supply. An event of considerable interest to the cotton trade is the Government grant of £500,000 for the development of East Africa and Uganda. The efforts to promote cotton supply under the auspices of the British Cotton-growing Association and the organizations for developing cotton-growing in German and French colonies are still active, and though they have not yet had a great effect on the world's supply there have been some encouraging developments.

In spite of the lock-out, the war, and other disadvantages, manufacturers generally have had an excellent year, and they have very good prospects of another. The home trade has been good, and most of the markets abroad have been very prosperous. India during the last twelve months has taken far more than its average or even its record consumption, and it has contracted ahead for supplies to an extent that may fairly be called unprecedented. Are they thus within measurable distance of a depression in the Lancashire trade, which depends so much on the Indian demand? It is impossible to answer this question unless by the platitude that in the cotton trade as in every other the periods of prosperity induce inflation, that depression follows, and that these are only incidents in the development of a great market. There is, as yet, no appearance of satiety, though the buying for India has naturally decreased.

The trade with China has been considerably less than that of 1911, but China is recovering from its long period of relative inanition. During most of the year the trading communities there have been tantalised by projected loans that were to oil the wheels of the commercial machine, but in spite of the disappointingly slow relief the conditions have continued to improve, and a good year's trade may be expected. Some good sales of staples have been made during the last few months, and there has now been a distinct improvement in the fancy trade, which is a valuable asset to Lancashire. Turkey, too, for obvious reasons, has been a disappointing market, and it is remarkable that the dislocations from the war have not been greater. Egypt is a spasmodic trader, and various circumstances have combined to make it only an indifferent customer this year. Exports to the Dutch East Indies are more than maintained at last year's high level; Japan on the evidence of the year, which cannot, of course, be trusted, appears as a dwindling market; Cuba has gone ahead remarkably; the South and Central American markets come out satisfactorily; and the Colonies have generally at least maintained their position.

There has been again a considerable shortage of weavers in Lancashire, and this may ultimately have some influence on the use of automatic machinery here; what we should suppose to be an innovation is the institution by a manufacturer of a weaving school at which the pupils were paid to learn their trade.

The strength of the yarn market during the year must be attributed in large measure to the excellent state of the export trade. Month after month the totals of the last year—which was a fairly good one—have been exceeded, and the home market here has been greatly relieved by the large and steady withdrawal of millions of pounds of yarn which in less happy circumstances might have been hawked about the Exchange. The near Continental countries have done well, and until the war came the Near Eastern markets had done exceptionally well. India, too, has been a good customer, though yarn buying recently has not held its own relatively with cloth buying for the Indian markets. The home trade, of course, has been remarkably good, and margins have been generally satisfactory without being exorbitant. Spinners have had great difficulty in obtaining good cotton, and it seems likely that their difficulty is to continue.

There has not been any conspiciously weak place in yarns, but lately the finer counts of American have been in strong demand, and perhaps ring beams have been generally stronger than twist cops. Good carded Egyptian yarns have done very well, but the lower grades of Egyptian are a little discredited, and have been to some extent supplanted by American. Extra hards were doing very well until the war broke out, since when there has been some accumulation of stocks and both stoppage and diversion of machinery. Doublers have had a good year, but recently demand has been mainly from the home trade, and the erection of a large doubling plant in Germany may tell appreciably against them. All things considered the year has been a remarkably good one, and with increasing looms and a position already strong the outlook is reassuring.

The growing of cotton in Imperial Valley, commenced in 1910, has proved successful. The returns, in bales of 500 pounds, are as follows: 1909-10, 300; 1910-11, 6,000; 1911-12, 9,500. The price in 1911 was 14 cents and for last year 9½ cents per pound. The soil is very rich, being a sedimentary deposit from the Colorado River. The product is nearly 1 bale per acre. At 9½ cents the net profit to the grower on land valued at $100 per acre is $15 per acre per annum, after allowing the farmer wages for his work. The Imperial Valley Oil & Cotton Co., of El Centro, handles most of the crop. It estimates the crop for 1912 at 20,000 bales.

In a recent report from Pernambuco, Brazil, Consul P. Merrill Griffith comments on the high cost of living in Pernambuco as compared with the cost in the United States. He says generally speaking the cost of living there is three times what it is here. In quoting the current market prices for some of the ordinary necessaries of life, he says that sugar costs 14 cents a pound, potatoes 10 cents a pound, rice 14 cents a pound, ham $1.50 a pound, bacon 63 cents a pound, while most drugs, toilet articles and groceries are sold for at least double the prices charged in the United States and the cost of clothing or any kind of wearing apparel is fully three times as great.

That man is best educated who is most useful.

HOW TO SAMPLE COAL.

BY E. G. BAILEY, MECHANICAL ENGINEER, FUEL TESTING CO., BOSTON, MASS.

SAMPLING AT MINES.

Samples of coal cut from the working face in a mine are of little value for determining the quality of coal shipped to market, due to failure on the part of the miner to eliminate all roof, floor, and parting slate, and impurities in the coal loaded, as is usually done in taking section samples. However, mine samples are of value in determining the character and approximate quality of coal from a new or idle property. They are also of value, when taken from strata of the seam separately, in locating the part of the seam which contains the higher or lower percentages of ash, sulphur, phosphorus, or clinker-forming impurities. If consistent with economical mining, parts of the seam may be left in, or gobbed, in order to produce a coal of desired purity to meet certain market demands.

Mine samples should be taken as a standard in representing the best coal that could possibly be produced with perfect preparation, and the quality of coal being shipped should be made to approach this standard as closely as is practicable.

In some mining districts the sulphur varies widely in different parts of a mine, and often certain headings will be found to produce coal low enough in sulphur to meet certain specifications while the average of the mine would be prohibited.

Very few coal operators open up a new property without first diamond-drilling it to learn the dip and uniformity of the seam. After expending so much money to obtain these cores, they should be analyzed and the quality of the coal from different parts of the field determined. It even pays to make a separate sample from each 6 to 12 inches of the core, whether divided according to natural partings or not.

The method of taking mine samples is to select or make a freshly-exposed full section of the seam and spread a canvas (4x6 feet) on the floor beneath it, then cut a channel about 4 inches wide and 4 inches deep from the bottom to the top of the seam, leaving any partings or streak of impurities which are to be discarded in mining. Care should be taken to see that all coal cut from the upper part of the seam falls onto the canvas, as it has a tendency to spread when it falls. It is also essential that the groove be uniform in size from top to bottom and not smaller where the coal is hardest and larger where it is softest. When the coal has well defined butts and faces it is easier to cut a uniform groove from the butts. After the sample has been dug from the seam it should be broken and reduced in accordance with the method described in the August, 1912, issue of COTTON, and placed in a hermetically sealed jar or can, if the actual moisture is desired, otherwise a coin sack will be more convenient. It is unnecessary to take a special moisture sample before crushing and mixing mine samples, provided the work is done immediately and before the sample is taken out of the damp atmosphere of the mine.

If detailed information of the quality of coal in different parts of a mine is desired, and the cost of having a large number of samples analyzed is not too great, such samples should be taken from every three of four working places. Where only a few samples can be analyzed it is not best to depend upon single sections for each sample, but three or more such grooves should be cut and the coal from them mixed as one sample to represent the heading or part of the mine from which they were taken.

It is frequently desired to know the quality of coal coming from different benches or strata of a seam, in which case the groove should be cut across such parts of the seam separately.

The comparison of the analyses of samples taken from mine cars with those taken from sections in the working places indicates the care used by the miners in cleaning the coal. A similar comparison between the results of mine car and railroad car samples shows the efficiency of the tipplemen and car trimmers with respect to preparation. Railroad car samples represent the quality of coal shipped to market, as well as a comparison of the different grades, where the coal is screened or washed.

Mine car samples should not be taken from the tops of loaded cars, as they are likely to be trimmed with lumps, thus preventing the sampler from securing a true proportion of the lumps and fine. There is also a chance of pieces of roof or draw slate having fallen onto the car, which might cause considerable error in a sample taken from the tops of the cars. It is better to take mine car samples from the open end of the car as it is being dumped, or from a chute as the coal passes. A large shovelful (15 to 20 pounds) should be taken from each mine car at the smaller mines up to every tenth or more cars at the larger producers, and the sample accumulated throughout at least one entire day's loading. It is often desired to know the quality of coal being loaded from different headings separately, which can readily be done by throwing the shovelfuls taken from different parts of the mine into different piles. Each individual sample should be about as large as if one large sample were taken from all mine cars as a whole. The total weight of sample taken in either case should be governed by the size and amount of impurities contained in the coal.

If there is any attempt made to throw out impurities as the car is being loaded, the samples representing the coal shipped should be taken from the railroad cars throughout their loading. Shovelfuls should be taken from the slanting surface just before a new mine car or basketful is dumped, and after the slate pickers have finished cleaning the one previously dumped. There is a tendency for the lumps and heavier impurities to go to the bottom of the slanting surface, hence shovelfuls should be taken systematically from various parts of this surface. The shovel should be pushed well into the coal in order to avoid getting only that on the surface from which the impurities have been picked. Occasionally it is desired to take such a sample from a single car, in which case it would be necessary to take several shovelfuls from each mine-carful dumped, but if a whole day's loading is to be represented, a shovelful need be taken from only every fifth, tenth, or whatever number of mine cars is necessary to secure the required total sample.

An operator often investigates the quality of coal actually being shipped to the market for the purpose of seeing whether or not the coal can meet certain specifications for ash, sulphur, or B. t. u., and if not, how much better preparation would be required to meet such specifications. Very valuable information is gained by taking duplicate samples from the cars and picking out all slate and sulphur from one and comparing the results with the regular representative sample. This will indicate what reduction can be made in the different impurities, and by weighing or

measuring the sample, and weighing and noting the size of impurities picked out, one can determine if this better preparation could best be accomplished through inside or tipple inspection, or whether a picker belt would be required. If a washery is being considered, laboratory washing tests can be made to determine the quality of washed coal and the loss resulting from washing to any desired quality.

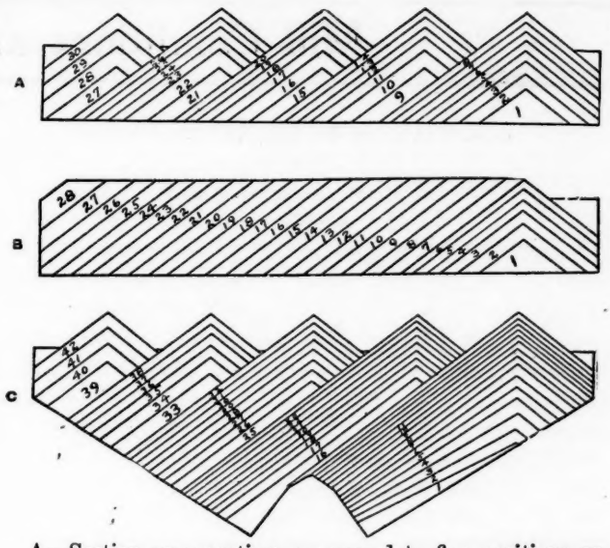
SAMPLING RAILROAD CARS.

There is great difficulty in obtaining a representative sample of coal from a railroad car that was loaded from individual mine cars, unless the coal can be sampled while it is being unloaded. The usual method of loading cars at the mines makes it almost impossible to obtain a sample from a loaded car which will contain a true proportion of whatever slate and impurities remained in the car. The slate and impurities are usually picked from the surface of a car as it is loading. Figure 1 represents some of the conditions frequently encountered; the areas containing numbers representing the quantity of coal from each mine car, and the numbers give the order in which the quantities were dumped. "A" represents a car that was moved to five different positions while it was being loaded. It is evident that any scheme of laying out points from which to take shovelfuls for a sample, or digging trenches, will not include any coal from several mine cars which lie near the bottom and will include an undue proportion of coal from the mine cars emptied on top. "B" illustrates a flat bottom car which was moved a short distance each time a mine car was dumped. When coal is loaded in this manner, the digging of a trench or holes should secure almost an equal proportion of sample from each mine car, but there is another error of even more importance that is likely to be greater from cars loaded in this manner than those like "A." This error is due to the tendency for the bone, slate and heavier impurities, as well as the lumps of coal, to roll toward the bottom of the car while it is being loaded. Some authorities, who have taken separate samples from the top and bottom of a car upon its arrival at destination, have claimed that the higher percentage of ash and sulphur found in the samples taken from the bottom of the car are due to the heavier impurities settling to the bottom during transit. While these impurities may tend to settle some in transit, the most plausible explanation of their being at the bottom of a car is found in the manner of loading the cars at the mines. Car "C," representing a steel hopper, illustrates the tendency for slate to slide to the bottom while being loaded, and the increased difficulty of obtaining a representative sample at destination without unloading the car.

If there is no alternative but to sample a loaded car, points should be located systematically on the surface and 10 to 15 holes dug at least 2 or 3 feet deep. The upright braces on the side of the car can conveniently be used as guides in locating the position of the holes according to some fixed system. Directions regarding the amount of sample to be taken and the method of its reduction, as given in the first article, should be followed.

If a sample is to be taken from a car being unloaded by hand, it is best for the sampler to have one shovelful out of every so many placed into the sample. As usually shoveled, there are about 125 to 150 shovelfuls per ton, and from the amount of coal in the car and the size of sample required, one can quickly estimate about how frequently a shovelful should be thrown into the sample.

If the car is unloaded through hopper bottoms to a pile, the sample should be taken as the coal is dropping out of the car, and if one car is to be sampled as an individual it may be necessary to retard the dumping in order to have enough time to accumulate a sample of sufficient size from all parts of the car. Coal should never be sampled from the pile if it is possible to do it otherwise.



A—Section representing car moved to five positions as loaded at the mines.

B—Section representing car moved a short distance at each mine car of coal was dumped.

C—Section representing steel hopper car moved to five position as loaded at the mine.

Figure 1.—Diagrams representing the distribution of coal as dumped from mine cars into railroad cars. Each area represents the quantity of coal from individual mine cars. The number represents the order in which the cars were dumped.

If a car is unloaded into a mechanical conveyor, either by hand or drop bottom, the sample should be taken from the conveyor as will be outlined in a later chapter. If a clamshell or grab bucket is used to take the coal from a car, the sample may be taken from the bucket itself or from the newly exposed surface in the car throughout the unloading, unless it is discharged into a mechanical conveyor or industrial railway from which the sample could be more easily taken.

A composite sample is often desired from several cars of coal loaded into or from a single vessel or else where shipped as a special consignment, in which case a proportional amount of the required sample should be taken from each car. In the case of coal shipped all rail to the consumer, it is best to sample a car individually, even if only a part of the total number of cars received can be tested. It is then possible to supply definite information regarding that particular shipment, while if a composite sample were made from two or more cars there could be no definite knowledge gained in case they were loaded at different mines.

"To be honest, to be kind. To earn a little and to spend a little less. To make, upon the whole, a family happier for his presence. To renounce when that shall be necessary, and not to be embittered. To keep a few friends, but these without capitulation—above all, on the same grim condition to keep friends with himself. Here is a task for all that a man has of fortitude and delicacy."—Robert Louis Stevenson.

Mill Conditions and Market Reviews.

SOUTHERN MILL SITUATION.

(*Special Correspondence.*)

Business just at this time is not as active as it has been for the past year, owing to the fact that there is only a short time before there will be some action taken on the present tariff. Many of the Southern manufacturers express themselves as having confidence in what Mr. Wilson and Mr. Underwood will do, as Mr. Wilson has been very emphatic in expressing himself that it would be foolish to throw any class of manufacturers into a condition where they would be unable to compete, thus making the laws of the nation harsh and unbearable. However, regardless of this confidence, business has quieted down, and will remain thus until after the extra session has taken what action it will in regard to a change in the provisions of Schedule I. It is not expected that if all of the provisions of the Underwood bill are passed, and it is very probable that almost the same bill will be presented now as that which was vetoed by President Taft, any great amount of harm will have been done the majority of the Southern manufacturers.

Another factor which has made itself felt in the placing of orders is the fact that the ginning reports have made a different showing than was expected by either side of the market. The last report showed a ginning up to Jan. 1st, of 12,919,257 bales, which averaging by the figures for the past several years, would seem to indicate a crop of something more than 14,000,000, considerably in excess of the Government estimate. The ginnings to date have been so heavy that the bulls are declaring that there is nothing more to gin, while the bears contend that this indicates a larger crop which will be substantiated by the last report which will be issued in March.

A call was issued by the Chairman of the Tariff Committee of the American Cotton Manufacturers' Association to meet at Washington two days before the hearing before the Committee for the Legislature on Schedule I, and that committee is now at Washington; but at this writing nothing of the action taken can be ascertained. It is expected, however, that those manufacturers who attended this meeting, and there were similar committees from other textile associations all over the United States, will have been armed with actual cost facts, and that they will be able to have some effect on the final drawing of the bill which will be presented to the Legislature for making into law.

North Carolina has been stirred for several weeks over the matter of proposed child labor legislation, at the present session of Legislature which is in session at Raleigh. The North Carolina Child Labor Committee has been active for the past two years and has gained for itself more than a common amount of outside interest among those who are not entirely familiar with cotton mill conditions in that state; and it is now endeavoring to pass laws which will not only be irksome to the manufacturers, but which at the same time will work a hardship on the many children who must of necessity find employment in the mills. The North Carolina Cotton Manufacturers' Association held a meeting at Charlotte on Dec. 31st at which time it went on record unanimously against any further legislation with regard to child labor in that state. However every manufacturer has not agreed with this Association, and there has been some sentiment and feeling displayed among the cotton mill men on this question.

Most of the mills are very well sold up, and are not actively in the market for orders. It is still a question of deliveries, though very few premiums are being offered. Buyers have paid high prices so long that they are now anxious to see lower, and with the slight reduction there has been lately in cotton, they want to place orders at lower figures, and in some cases are doing so. This has been more apparent in the yarn market than elsewhere, as yarns are now not so strong as cloth and knit goods. Spinners have been accumulating to a small extent and they have in some cases accepted lower prices to clear their stock, with the natural effect this has had on the market generally.

Knit goods continue the strongest in the textile field. Mills are sold through to Spring, and some of them are taking small orders on Fall requirements. There has been no concession in prices, though they have been able in some cases to purchase yarns cheaper.

The cloth market has not been a very active one, the greatest amount of trading taking place on brown cottons. No price concessions are being granted, and mills report to be well sold up.

Since our last letter there has been considerable activity in the mill building and improvement line; with a number of reports of new mill propositions. Summarized, the report of mill building, etc., in the South is as follows:

New Mills Proposed: A $300,000 mill is being organized at Mocksville, N. C., by local capital. Mayesville, N. C., has incorporated a company to build a $100,000 mill to be equipped with 5,000 spindles. The Crown Cotton Mills are interested in a plan whereby they will probably erect a new mill at Dalton, Ga. A new mill has been proposed for Claxton, or Hagan, Ga. The citizens of El Paso, Tex., are interested in organizing a $300,000 company to erect a cotton mill. Lydia Mfg. Co., has been incorporated at Lydia, N. C., at $30,000. Evansville Hosiery Mills, Evansville, Ind., incorporated at $10,000 to erect a knitting mill. Highland City Mills, High Point, N. C., have been organized and incorporated at $250,000 to build and operate a 10,000-spindle mill, which will be probably enlarged later. A knitting mill will probably be built at Cartersville, Ga. A new million-dollar company has been organized by the Erlangers at Lexington, N. C., which will probably be known as the Bel-Vi-Dere Mills, to be first equipped with 25,600 spindles and 700 looms, and later with 40,000 spindles and 1,000 looms. Interests are at work in organizing a new mill at Vernon, Tex. The Kearn Brothers, of High Point, have erected a building, purchased 100 knitting machines, and have started a knitting plant. A new mill has been mentioned for Kannapolis, N. C., also for Randleman, N. C.

Additions to Mills: Southern Mfg. Co., Oxford, Ala., are adding 1,000 spindles and 200 looms, at a cost of $4,000. Stevenson, (Ala.) Mills are adding to their building and installing humidifiers. Yocona Mills, Water Valley, Miss., are adding a dye and winder house. Docotah Mills, Lexington, N. C., are adding spinning frames and warpers, also

having new machine shop erected. Merrimack Mills, Huntsville, Ala., are adding a new warehouse, and will possibly later build another mill at that place. Monarch Mills, Dallas, N. C., are adding 60 x 75 foot addition and 4,000 twister spindles. Marion, (N. C.) Mfg. Co., are adding 300 looms, 25 cards, and a number of spinning spindles. Avondale Mills, Birmingham, Ala., have made an addition to power equipment. Alpine Mills, Morganton, N. C., are building a new warehouse. Unity Spinning Mills, LaGrange, Ga., is adding eight spinning frames. Daisy Hosiery Mills, Burlington, N. C., is adding a brick building, with equipment, etc. Adelaide Mills, Anniston, Ala., are adding 1,616 spindles. Anchor Mill, Huntsville, N. C., will add 5,000 spindles at once. Mills Mfg. Co., Greenville, S. C., will probably make considerable additions to their equipment. Social Circle (Ga.) Cotton Mills will add 140 looms. Riverside Mills, Augusta, Ga., will probably add a warehouse and machinery at a cost of $100,000. Riverdale Mills, Riverdale, Ala., are adding 5 new speeders. Fulton Bag & Cotton Mills, Atlanta, Ga., are adding humidifiers. Inman (S. C.) Mills will probably add automatic looms. Atherton Mills, Charlotte, N. C., are adding humidifiers. Keystone Finishing Works, of Burlington, N. C., have added a $5,000 building. Westervelt Mills, Greenville, S. C., have added a conditioning machine. Ashcraft Mills, Florence, Ala., will probably make a large addition in the near future. Yazoo (Miss.) Yarn Mills are adding 1,500 spindles and accompanying machinery. Eureka Cotton Mills, Englewood, Tenn., are adding electrical machinery. Pioneer Cotton Mills, Guthrie, Okla., are adding drying machinery. Russell Mfg. Co., Alexander City, Ala., have contracted for 5,016 additional spindles. Tidewater Knitting Mills, Norfolk, Va., are adding 660 mule spindles, and also a warehouse 250x56 feet.

Changes and Reorganizations: International Mills, Baltimore, Md., are being completely reorganized. The Ide Cotton Mills, Jacksonville, Ala., are now known as the Profile Mills. The Broad River Mills, are the reorganization of the old Whittaker Mills, which were recently sold; the capital of the new company is $50,000. Anna Cotton Mills, Kings Mountain, N. C., have changed over from the production of sheetings and yarn to yarns only. Premier Mills have been moved from Barton to Helena, Ark. Oklahoma City (Okla.) Cotton Mills, will be reorganized by the Western Guaranty and Trust Co. Union Cotton Bagging Co., Norfolk, Va., has been petitioned for receivership, by minority stockholders. The Thos. F. Loyd Mills, Chapel Hill, N. C., have been purchased by J. L. Carr & Sons, of Durham, and will be reorganized as the Durham Hosiery Mills No. 7.

NEW ENGLAND MILL SITUATION.

(Special Correspondence.)

Trade has not been active with the mills for the past five or six weeks on staple lines of goods, such as brown and bleached cottons, prints, ginghams and fine dress cottons. In the past two weeks, however, business has been active on blankets and napped cottons for the fall season, and there has been renewed inquiry for other lines. The mills have good orders ahead still and are not troubled much by the absence of new business when all the circumstances are considered. An easing cotton market, a strike among the cutting trades in New York, and the renewal of tariff hearings at Washington, would each be sufficient cause for hesitation, and when is added to these an uncertainty in the money markets, it can hardly be expected that broad trading would go on.

Most manufacturers believe the fundamentals are sound and that the lull of the past few weeks will prove to be nothing more than seasonable after the large business of the fall. They do not look for a broad and rising market while a tariff reduction is in prospect, but at the same time they believe the actual requirements for merchandise are large and the purchasing power of the country is still unimpaired to any noticeable extent. One of the largest of the Boston factors in the trade believes that the first half of the year will be more or less fitful, but in the long run of months, he said last week, it will be found that distribution for 1913 will be pretty steady, and moderately profitable. There has been more or less price irregularity in cloths of various kinds, and there have been recurrent labor troubles of a minor character. The shortage of help noted last year is a factor of large import in manufacturing and it will continue to affect merchandising by restricting the output and delaying the delivery of goods due.

While print cloths have been declining in price to an average extent of 7½ per cent down from the top, prints have held their own and printed cambrics have been placed at value. Although the market on fine and fancy goods has been easy, there has been a distinct improvement in the demand for dress ginghams. Staple ginghams have been advanced ½-cent a yard to a basis of 6¾ cents for Amoskeags. Staple tickings have been advanced ¾-cent a yard to a basis of 13¾ cents for A. C. A. While fine carded cloths have declined a full ¼-cent a yard, last week the price of standard drills was advanced ¼-cent a yard to a basis of 8¼ cents.

The market has been full of just such contrary conditions and the underlying fact of great importance has been that goods have not accumulated and trade in retail or jobbing channels has not fallen off. The conservative tone to production is paralleled in the care used in mill agencies in accepting business that has any flavor of speculation in it. No one seems to lose sight of the possibility that merchandise values may have to be marked off when a new tariff bill is enacted. This was foreshadowed in the semi-annual report of the president of the H. B. Claflin Company two weeks ago, where it was openly stated that this large distributing concern had reserved a substantial part of earnings to be used for depreciation.

Throughout the large mill centers interest in the progress of the great strikes among garment workers in New York and elsewhere has been acute. The powers behind the strikers are the same ones that instigated the great strikes in New England mill centers a year ago. It is now noticed that the New York papers that were crying out against Lawrence manufacturers for the treatment of Ettor and his ilk, are now demanding legislation that will prevent talk of the Ettor brand being legal under the present day theories of freedom of speech. All of which is justifying the stand taken by the mills and their owners against that form of unionism that is modified anarchy and socialism.

Up to the middle of last week the effect of the strike was that several mills were compelled to withhold shipment of goods to cutters until the troubles clear up. The cutters have not asked to have goods cancelled, and cancellations will not be accepted unless confession of inability to pay is made. It is thought at this writing that some form of com-

promise will be reached before the end of the month in those lines where cotton goods are used most largely, but it may be some time before the clothing manufacturers' troubles are ended. Cotton linings and shrunks will be affected while those troubles are on.

Print cloths declined in price during the past four to six weeks from the top of 5½ cents for 38½-inch 64 x 60s to 5⅛ cents bid and declined. Sales have been made at 5¼ cents. Regular print cloths have dropped to 4 cents from the top of 4⅛ cents. Fall River mills are still running short to an extent of 70,000 pieces a week, full product being impossible with the limited list of employees. The mills are about 50 per cent sold ahead through February. The stock of print cloths on hand at Fall River is about 550,000 pieces, or hardly two weeks' output.

Staple prints are very quiet in the narrow lines. Some export business is being done and deliveries are being made on all orders and no accumulations of prints are reported. The business on percale has been steady, but deliveries to New York cutters were held up for two weeks and have only recently been cleared up by a settlement of the labor troubles with wrapper makers.

Bleached goods are on a basis of 8⅝ cents for 4-4 Fruit of the Loom, which is as high as any price reached last year. Deliveries of goods due are wanted by the jobbers, but there is no anticipation of future wants going on and the disposition of jobbers is to order additional goods from week to week. While many other kinds of goods were held back in delivery by the strikers, bleached fabrics were not seriously troubled.

The opening of the blanket season was followed by prompt confirmation of orders placed in December subject to the opening price being satisfactory. The list prices of the Nashua lines of blankets showed advances varying from 7½ to 10 per cent above the prices of a year ago. This was substantially the basis of the prices made by the Tremont & Suffolk. The Nashua and Esmond lines of fancy blankets were the largest ever shown and these goods were snapped up quicker than the plain goods. Some of the new jacquard cotton blankets are superior in every way to anything previously shown in this country. The leading blanket mills are sold up for the season. Some would not go beynod September, and others tried to limit business to August.

Flannelettes and domets were opened on the 20th inst. by the Amoskeag Company. The trade had been waiting for this action. The new prices on Amoskeags were on a basis of ¾-cent a yard above the opening prices of 1912 for plain goods, and 1 cent a yard higher on fancies, except Teazle downs, which were advanced only ¾-cent. These figures were higher than a year ago, but not higher than prices paid for flannelettes delivered by this company after October. The 1912 cloths made by the Amoskeag, is priced at 8½ cents, as against 7½ cents at the opening a year ago. Southern flannelettes were advanced from ½-cent to ⅝-cent a yard on the plain goods, and ¾-cent a yard on the fancies. At this writing (22nd), it is the belief of manufacturers that they will sell up every napped fabric they can make through the balance of the cotton year and at the advances asked.

The advance of ¼-cent a yard on standard drills was made because of the pressure for more goods for India shipment. The Pepperell Mills sold 32,000 bales of these drills to India last year, and the mills are stated to be under order till May 1. The new business at the higher price will take care of half of the May and June output.

The fine combed yarn goods business has been very light for some weeks past. Reorders have come in for novelty goods in fair volume, but there has been great disappointment in the volume of business for delivery after February 1. Voiles in the gray have been very weak and lawns have dropped ¼-cent a yard from the recent top. There has been a fair business on piques and novelty ratines, but these goods are not sufficiently in demand to furnish a volume business for the looms. Fine crepes have sold well recently. The feeling of anxiety among fine goods manufacturers has been acute this month, and many of them are in Washington at this time, getting their cases before the Ways and Means Committee. One of the most significant things is that many of the manufacturers who have gone to Washington did not take an active part in the Arkwright club meetings or in any other association meetings, but have been known as very successful manufacturers.

Among the machinery manufacturers there is anxiety as to the course of the tariff committees, and it is a saying among them that no one can predict what will happen. At the present time there is a fair business on the books, but few investors are anticipating on textiles and it can hardly be expected that trade will broaden until the tariff matter is finally settled.

The bleacheries have been running in full on orders that are now being completed. The finishers have been very active on novelty work, but there has been a dearth of business on many of the plain fabrics. The dyers have found work more plentiful than the white goods factors.

The New England Cotton Yarn Company is to cancel its lease to the Union Knitting Mills, of New York State, the bargain of three years ago not having proved profitable to the knit goods concern. The underwear and hosiery mills are very busy, and the yarn mills are having the most prosperous period for years past.

COTTON CROP CONDITIONS AND A REVIEW OF THE MARKET.

(*Contributed Exclusively to* COTTON)

BY H. AND B. BEER, NEW ORLEANS.

The caution that was advised on the long side of the market one month ago, when values were dangerously high, was timely and adhered to by many in the trade, for while there occurred a further improvement shortly thereafter, owing to the government's crop estimate, 13,820,000 bales, values have experienced a sharp decline of late, due to the realizations that the Bureau underestimated the crop by a big margin; present indications pointing to a commercial crop of about 15,000,000 bales.

The United States Census Bureau, in report of January 9, showed that 12,919,000 bales were ginned to January 1, against 14,317,000 to the corresponding date one year ago when the commercial crop was 16,138,000 bales. After January 1 of last year, 1,821,000 bales were accounted for. On the basis of 500 pounds gross weight, on which basis the government's estimate was based, the states of Alabama, Georgia, South Carolina and North Carolina have already ginned as much or more cotton than the Bureau estimated for the whole season, while Texas, which looks good for 5,000,000 bales, and the other states are not far behind. The following is the ginning by states to January 1, compared with the government estimate for the whole season, linters, etc., not included: Alabama, 1,290,000 vs. 1,330,000; Arkansas, 732,000 vs. 854,000; Florida, 56,000 vs. 68,000; Georgia,

1,767,000 vs. 1,701,000; Louisiana, 367,000 vs. 435,000; Mississippi, 937,000 vs. 1,109,000; North Carolina, 857,000 vs. 878,000; Oklahoma, 846,000 vs. 1,039,000; South Carolina, 1,174,000 vs. 1,184,000; Tennessee, 249,000 vs. 280,000; Texas, 4,462,000 vs. 4,850,000; all other states 82,000 vs. 92,000.

With the opening of the new year there has been a marked falling off in the export demand. In the middle of December exports to Europe were 380,000 bales larger than to the same date last year, today they are 171,000 bales smaller than last year, having lost 557,000 bales during the past four months, when compared with one year ago. Shipments to Europe continued heavy during the whole of last season, having been especially heavy last January, February and March, but will probably be much smaller this year.

As a result of the want of an urgent export demand from Europe, receipts, which, however, are expected to fall off sharply owing to the rapidity with which this crop was marketed, have been rather light of late. But this feature has prevented stocks at the 30 counted interior towns from decreasing the past week. As a matter of fact they show a gain of 1,000 bales, against a decrease for the corresponding week of last year of 55,000 bales. It is probable, therefore, that unless the demand from Europe improves, stocks will not lose any faster than after this time one year ago.

Up to date 10,045,000 bales of the American crop have been marketed compared with 10,288,000 bales to the corresponding date one year ago, when the crop was over 16,000,000 bales, which, therefore, is a very good showing, and is another indication that the crop has been underestimated. Asia has large crops of cotton this year. To date receipts at Alexandria, Egypt, total 6,177,000 cantars, against 4,806,000 to even date last season, while arrivals at Bombay, India, where the crop was late, total 658,000 bales, against 566,000 bales last year.

Spinners takings of American cotton thus far this season total 6,388,000 bales, compared with 6,211,000 to this date one year ago, which is remarkably large considering the fact that last season's takings of American cotton by the world were 15,585,000 bales. But the greater part of these acceptances represent old business, cotton contracted for when the market was much lower than it is today. It is probable, therefore, that mill takings by the world in the future will be much smaller than after this date last season. This is already indicated by the big falling off in exports to Europe of late.

The world's visible supply continues of record-breaking proportions for this time of the season, being as follows:

	This Year	Last Year
World's visible supply of American	5,009,000	4,887,000
World's visible supply, other kinds	1,242,000	821,000
Total world's visible, all kinds	6,251,000	5,708,000
Middling, New Orleans, today	12¾cts	9⅝cts.

THE KNIT GOODS MARKET.

The knit goods market for the past month, while set an excellent example by the earlier weeks in December, dwindled off for the holiday season and up to the present has remained comparatively quiet, awaiting the action of the knit goods buyers who had a meeting at the Waldorf-Astoria during the middle of January. The uneasy position of the cotton market is probably a large factor in determining the buyers to hold off temporarily. However, the squeeze in January may have a tendency to induce further offers on their part.

While the middle of December found jobbers buying freely on fall 1913 underwear and what was believed to be the heaviest demand in the knit goods trade in many seasons having been in evidence for several weeks prior to this time, the approach of the holiday season gradually cut off the business, while the stock taking time of the first of the year assisted materially in upholding that cut-off. Union suits made gains in the underwear trade and orders were not worrying many manufacturers as much as where they could cover their needs in the raw material at fair profit. The tariff created little interest at this time and many salesmen report that they heard nothing of it on their selling trips during the holidays. Some buyers have complained that prices on cotton underwear were decidedly stiff while others seem to be of the opinion that the opening prices would be the lowest seen during the entire fall season of 1913. Men's cotton ribbed goods opened at $3.12½ a dozen one year ago, while the opening season of 1913 was on an average of $3.62½ a dozen. However, the raw material one year ago was selling on a basis of 8 cents per pound while this year it is around 12 to 13 cents. Union suits sold freely for next fall and many mills are in a position where they do not care to accept further orders. Sales of fleeces were also good and as the production of these in the United States is somewhat limited, it was rumored that late buyers would probably have considerable trouble in getting the deliveries they desired. In the hosiery end of the market prices were very firmly fixed with buyers paying advances on goods for fall of 1913 without much protest. On fleece lined hosiery many complaints were made by buyers regarding late deliveries and some of the mills were reported to be anywhere from six weeks to two months behind on orders for the current heavy weight season. Silk hosiery sold in large volumes and most of the mills have orders on their books sufficient to run them to the fall of next year.

January found the hosiery market expectant and the time for the annual influx of buyers about to arrive caused considerable strengthening in the general conditions. While knit goods lines were very quiet as stated above, partly because of holiday conditions and stock taking and partly because of expectant changes in the raw cotton market, affairs moved along in a manner characteristic of the period following the initial business. The bulk of the orders were expected to be given by the buyers on their arrival and under conditions prevailing in the cotton market at that time it was believed that the business already placed would hold.

At the time of writing buyers from all sections of the country are in the market and will probably cover all needs for the spring and fall seasons and attend the annual convention of wholesale buyers at the same time. The jobbers' association held its annual meeting and the annual banquet of the association was held at the Waldorf-Astoria. Selling agents report that they are well satisfied with what has already been accomplished on their line and that orders on their books are well ahead of those for the same period last year. Buyers who have been operating in the market for the past few days have shown more interest in further supplies of light weight goods than in fall lines. Most retailers and jobbers wound up the old year with very small stocks on their hands and the unusually mild winter up to date has resulted in the still further depletion of stocks. Manufacturers of heavyweight underwear are taking about all the orders they care to for the present, and in many

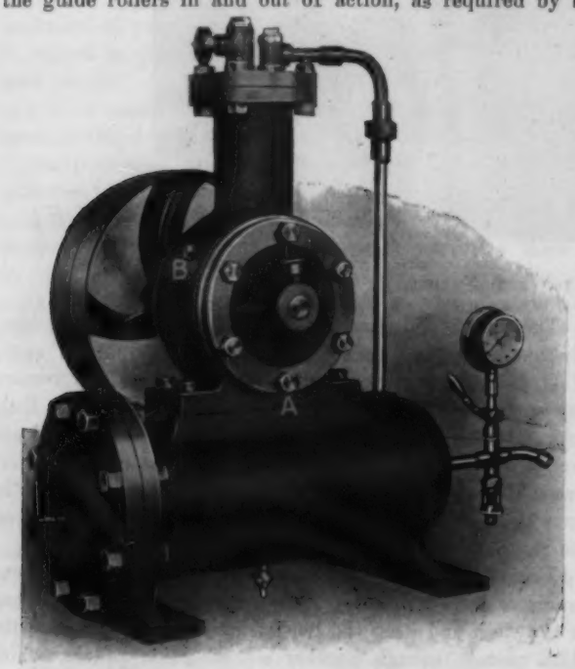
delivering the fabric into the clip with a variation of not more than 1/16 of an inch. The machine, it is pointed out, does not work the middle of the cloth, but merely the selvage, and each one independent of the other.

It is also to be noted the guider alone is often all that is required for other machines, such as mangles, printing, damping, and drying cylinders, as well as in front of some straight-running self-closing clip tenters, and it can be placed easily in front of these machines. It will guide the cloth at any speed evenly and straight into such machines, thus eliminating the attention of a man doing this work. He thus can utilize his time to better advantage looking after the general working of his machines. At the same time, like the full guider and feeder, it also takes curls out of the selvage.

It is possible to get maximum production from this machine. The faster it is operated, it is stated, the better the results accomplished. Then again, a very important advantage is its labor-saving feature, as it requires no constant attention from the operator, so that one man can attend to as many machines as happen to be in one room, as he is practically required only to bring the cloth to the machine.

On account of its continuous run, day or night, and even through meal hours, another factor for greater production is developed. There are no interruptions caused by the operator leaving his machine. There are thus no damaged goods, through bad or careless feeding, and feeding by hand is entirely eliminated, thus doing away with any possibility of fraying of the goods caused by hand feeding. The machine is simple to operate, and requires very little attention. In the case of heavily starched goods, the machine, it is stated, will not choke up, while the filling is not scraped off the cloth.

Both the guider and feeder are fitted with headstocks, carrying guide rollers, some of which are actuated by compressed air as the cloth runs through these rollers it comes into contact with the lever arm previously mentioned. This, as before noted, controls the supply of air, thus putting the guide rollers in and out of action, as required by the position of the selvage of the cloth.



COMBINED AIR COMPRESSOR AND FEEDER.

For the supply of compressed air a special combined air compressor and receiver is made. These are very compact and self-contained, and can be placed in any convenient position in the plant, where they can be driven by a continuous running 2-inch belt. The compressed air is led to the guiders and feeders by a 1-2-inch wrought iron pipe. This compressor, it is stated, is lubricated by splash, and the only attention required is oiling once a week. It is not water-jacketed, as this is not necessary, since the pressure required to work at is not more than 30 pounds, but it can easily and quickly be set for other pressures from 10 to 40 pounds if desired. There is also a pressure gauge and a relief valve to blow off at the desired pressure.

The saving in damaged goods and the labor required, it is stated, will soon pay for the apparatus, while the satisfactory results obtained will warrant for this machine the consideration of American textile manufacturers.

As a demonstration of the satisfactory operation of the machines attention is called to the fact that they are installed in practically every manufacturing country in Europe. The well-known Bradford Dyers' Association alone has 24 machines in operation. Other well-known European plants are operating these machines.

THE FARBENFABRIKEN OF ELBERFIELD CO., 117 Hudson St., New York City, is sending to the trade in bound volume form, their cotton color cards for 1911 and also their wool color cards for 1911. These color cards are bound in two volumes, the cotton and wool being separate, printed in three languages, German, English, and French. They contain samples and dyeing receipts and are of unusual interest to practical dyers. They are also sending out late single sheet color cards of the following colors: Acid Chrome Black S. T. C.; Sulphon Violet R, Extra; Indian Yellow, G. N.; Katigen Red Brown L, Extra; Brilliant Sky Blue 8 G Extra; and Brilliant Chrome Violet B. D.

THE GEORGE B. CLARK CO., of Windsor Locks, Conn., is sending to the trade Bulletin "B" illustrating a portion of the line of trucks they manufacture. This bulletin is an attractive one, and illustrates several new types of trucks which have never before been described in print. It describes only hand trucks, and among the various styles illustrated, are various patterns of store and warehouse trucks; a number of varieties of barrel trucks; freight trucks for railroad and steamboat use; several patterns of hotel trucks; a truck made especially for handling bales of cotton, rags, etc.; several patterns of trucks for goods in cases; special trucks designed for articles of an oval nature, such as cheese boxes or other similar material in a like shape; special trucks for bags and rolls of paper; trucks with rubber wheels for hotels and stores; special trunk carrying trucks, stove carrying trucks, keg and barrel trucks, ash-can trucks, and others.

One special kind of truck manufactured by this company and illustrated in Bulletin "B," is a side dump coal truck designed for transporting coal and ashes, to and from the boiler house and made to run on a track or floor as ordered. This truck would undoubtedly handle coal in greater quantities and at a less labor cost than would be possible with the ordinary method of using wheel barrows. Mills with coal storage pits located adjoining their boiler room will find a truck of this nature a great time-saver. Copies of Bulletin "B" may be secured by any interested

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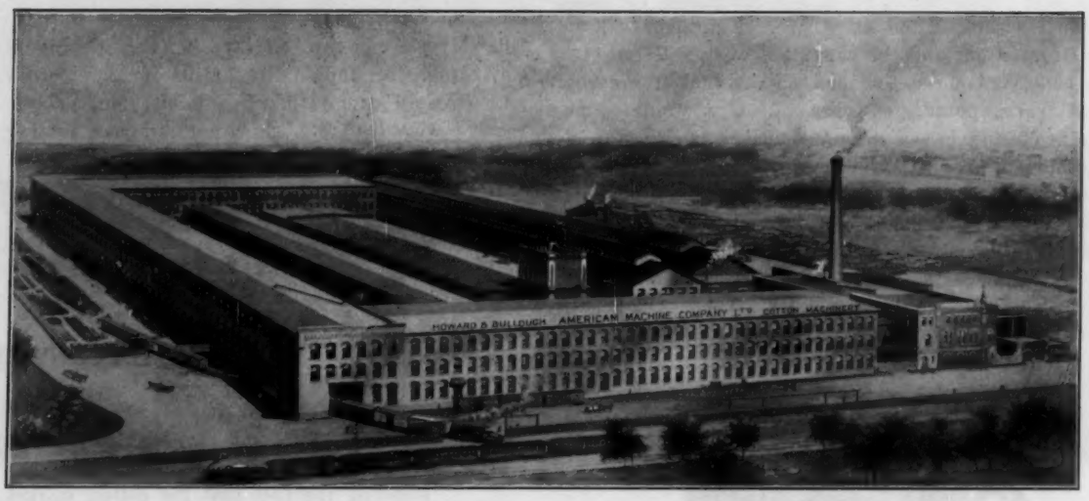
H. & B. AMERICAN MACHINE COMPANY

PAWTUCKET, R. I.

Cotton Mill Machinery



Hopper Bale Openers,
Conveying and Distributing Systems,
Automatic Self Feeders,
Self Feeding Openers,
Breaker Intermediate and
Finisher Lappers.

Revolving Flat Cards,
Drawing Frames,
Slubbing Intermediate and
Roving Frames.

Spinning Frames,
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All parts of our machines are made by special tools and are exact duplicates.

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Our latest Catalogue should be in the hands of every Agent, Treasurer, Superintendent and Overseer. It is a Text Book as well as a Descriptive Catalogue.

We Invite
Investigation and Comparison

A NEW DRAWING ROLL.

One of the important and perhaps the greatest improvement that has been made in spinning during the past 25 years is that embodied in the new Richards-Hinds spinning roll, a patent for which has recently been granted to Messrs. Richards & Hinds.

It has always been recognized by practical spinners that the closer setting that could be made in the spinning roll, the better would be the work turned out. The effort of many spinners has been in this direction of getting the closest possible setting. At the same time there has always been the danger of "cockley" yarn due to getting the roll set too close for the staple being run.

It may seem incredible, but it is claimed that with the Richards-Hinds roll it is possible to run staple as long as 1¾ inches, with the setting between the front and middle roll 1 inch, without running any risk whatever of "cockling" the yarn. Practical spinners will at once understand the value of this improvement, as it is a recognized fact that the closer the setting, the smoother and stronger will be the yarn turned out and the better the work will run.

The claims advanced for this roll are that it prevents "cockley" yarns; producing yarn of extra strength; assists in producing better spinning; makes less waste; allows greater production with improved product; reduces spinning cost; requires less changes in the setting; and saves one third over using leather covered rolls.

It is claimed that with this roll in use, it is no longer necessary to change the setting of the roll when changing from one length of staple to another. This in itself will be recognized as a very strong point in favor of the roll. This roll, being run without the customary leather cover, is another argument in its favor. Arrangements have been made to supply these rolls through THE METALLIC DRAWING ROLL CO., of Indian Orchard, Mass., who will gladly furnish further information to interested inquirers.

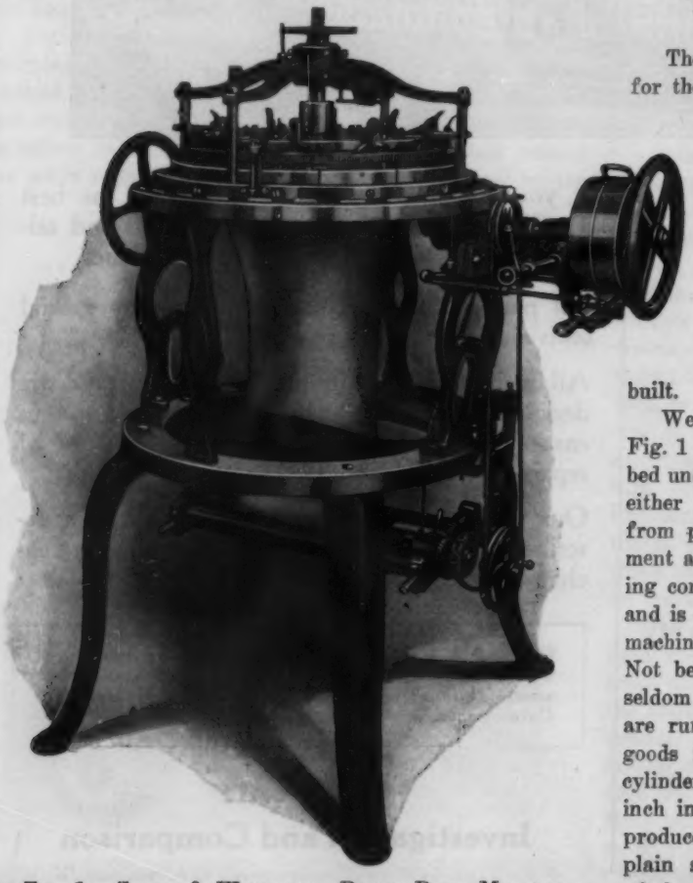


FIG. 1. SCOTT & WILLIAMS—PLAIN BODY MACHINE.

THIN-PLACE PREVENTER.

Our readers who have troubles and loss from thin-places on their automatic looms will be interested in learning of the rapidly increasing sale of the Clayton & Bentley automatic thin-place preventer, manufactured by the CLAYTON & BENTLEY CO., 128 Madison Ave., Atlanta, Ga.

They advise that, in addition to the eighty-odd mills previously reported as sold, the following mills have recently equipped their looms with their thin-place preventer: American Spinning Co., Greenville, S. C.; Anderson Cotton Mills, Anderson, S. C.; Hartsville Cotton Mills, Hartsville, S. C.; Laurens Cotton Mills, Laurens, S. C.; Tucapau Mills, Tucapau, S. C.; Warren Mfg. Co., Warrenville, S. C.; Roanoke Mills, Roanoke Rapids, N. C.; Ella Mfg. Company, Shelby, N. C.; Covington Mills, Covington, Ga.; Indian Head Mills of Ala., Cordova, Ala.; and Home Cotton Mills, St. Louis, Mo. Those of our readers who are troubled with thin-places in their goods, will make no mistake in investigating this device.

THE SOUTHERN MILLS CORPORATION, of Oxford, Ala., have recently installed spinning frames and are making single yarns from 3's to 10's put up in skeins, tubes or cones. They are also installing twisters.

MODERN KNITTING MACHINERY.

The year 1912 produced the largest amount of business for the American knit goods manufacturers that had ever been recorded on a presidential year. Notwithstanding the fact that the cotton market was inclined to be bullish, and that the price of cotton yarns were not only higher than for some time past, but constantly advancing, still the knit goods manufacturers have been able to fill their orders and do so at a profit. One of the largest contributory causes to the success of the knit goods manufacturing industry has been the use of modern knitting machinery, well designed and well built.

We are illustrating herewith two machines of this class. Fig. 1 is a plain body machine for the manufacture of ribbed underwear. This machine makes only one class of work, either tuck or plain, and has no provision for changing from plain ribbed stitch to tuck stitch to shape the garment at the waist portion. It is used exclusively for making continuous lengths of fabric of one character of stitch and is favored by large operators when a given number of machines are constantly at work on one kind of fabric. Not being capable of making a variety of stitches, it is seldom used as a part of a small plant, where machines are run on shaped goods in one season and on straight goods in another. This machine is equipped with steel cylinders and dials, and is made up to 14 needles to the inch in each. A 13-inch machine of this description will produce approximately 22 dozen per day of ten hours of plain straight goods. The production of straight tuck stitch goods, will of course be in proportion. However,

Barrett Specification Roofs

The Most Popular Roof In The World.

THE illustration above shows the familiar gravel surface of a Barrett Specification Roof.

Roofs of this type are used with the fullest satisfaction on thousands of great factories and commercial establishments all over the United States.

The Barrett Specification is the standard method for constructing these roofs.

It specifies the kind of felt and pitch that should be used, the quantity required and it further defines tht correct method of applying same. It also specifies a simple and practical method of inspection and provides for the identifying of the pitch and felt.

If this specification is carefully followed, the owner of the building is assured of a roof that will usually last twenty years or more without any maintenance expense whatever.

We shall be pleased to mail architects, engineers or owners of buildings, copies of The Barrett Specification with diagrams from which blue prints can be made. Address nearest office.

Special Note.

We advise incorporating in plans the full wording of The Barrett Specification, in order to avoid any misunderstanding.

If any abbreviated form is desired, however, the following is suggested.

ROOFING:—
Shall be a Barrett Specification Roof laid as directed in printed Specification, revised August 15, 1911, using the materials specified, and subject to the inspection requirement.

BARRETT MANUFACTURING COMPANY

New York Chicago Philadelphia Boston St. Louis Cleveland
Pittsburgh Cincinnati Kansas City Minneapolis Seattle Carey, Ala.
The Patterson Mfg. Co., Ltd., Montreal, Toronto, Winnipeg, Vancouver, St. John, N. B., Halifax, N. S.

TRADE B MARK

it must be borne in mind that the production of any knitting machine varies with and is dependent upon the texture and character of the fabric.

The hosiery machine illustrated in Fig. 2, is built on the stationary needle cylinder, and revolving cam ring principle. It is equipped with the Scott & Williams inserted wall cylinder in all gauges finer than 176 needles in 3 3-4-inch diameter, and is, therefore, especially adapted for fine work. In courser gauges the cylinder is made of soild forged steel, hardened. The needle cylinder is so arranged that it can be removed and replaced in the machine more readily, it is claimed, than that of any other machine now on the market. This machine is, therefore, admirably adapted for transferring directly on the needle without the use

FIG. 2. GEO. D. MAYO HOSIERY MACHINE.

of a transfer ring. This machine combines the best features of the Scott & Williams and Mayo machines and is an excellent machine for plain work. All parts are absolutely interchangeable.

Further information in connection with either of these machines may be secured by addressing Scott & Williams Inc., 88 Pearl street, Boston, Mass., who will be glad to send catalogs of any or all their machines to those interested.

Inquiries about anything pertaining to the textile industries will be cheerfully answered by COTTON.

A NEW AUTOMATIC LOOM.

For several years there has been a call for an automatic loom on which goods could be woven with filling of different colors inserted at pre-determined intervals, and equipped with the necessary detector and safety devices to admit of weaving practically perfect goods.

As a result of the experimental work carried on for a considerable period of time, and the inventions resulting therefrom, the CROMPTON & KNOWLES LOOM WORKS is now able to place upon the market a loom which is a marvel of ingenuity, accuracy and efficiency.

The construction embodies simple and efficient means adapted to keep in practically continuous operation a loom weaving goods with filling of two or more colors, automatically changing, just before the exhaustion of the filling, the depleted bobbin, and supplanting it with a filled one of the same color selected from the magazine.

The loom is equipped with a stationary magazine or battery, holding in reserve, in vertical ways, the filled bobbins. While the bobbin retains sufficient quantity of filling, the feeler motion is inoperative; upon the near exhaustion of the filling, the feeler becomes operative, causing the indication for the initial movement of the bobbin from the magazine and then the displacing of the bobbin in the shuttle by a filled one of the corresponding color.

In the construction of the Automatic loom a warp stop motion is one of the essentially requisite features.

Warp stop motions have come more and more to be recognized as an invaluable addition to the equipment of mills, either for plain or fancy weaving. Their use insures better cloth and more economical weaving than it is possible to obtain without them.

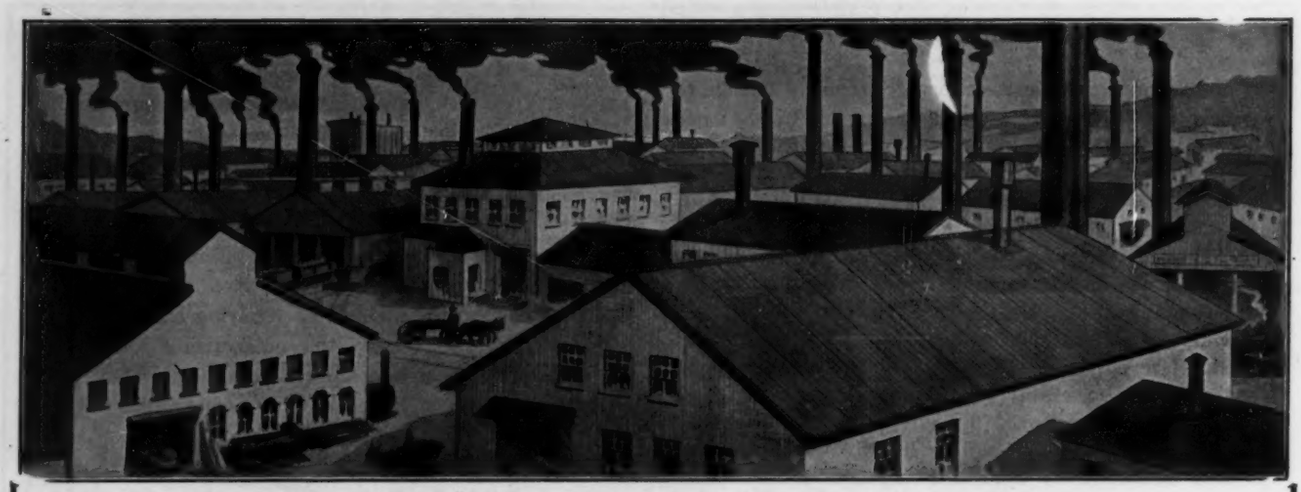
This company has given a great deal of time to the warp stop motion problem, and has employed the best inventive skill at their command for its solution.

While Crompton & Knowles warp stop motions are designed to be readily applied to old looms already in the mills, as well as to new looms, the style adopted for the new automatic loom was especially designed for this machine.

The various inventions embodied in the loom are so devised and constructed that the selecting from the magazine of other than the proper color required in the pattern being woven is impossible, as the mechanism controlling this selection is always in unison with the operating shuttle.

The development of the loom, certainly admits of a very material saving in the weave room expense on account of the almost continuous running of the loom, and the fact that a greater number of looms than of the ordinary type can be operated by one weaver. They invite inspection of this loom and full information will be gladly furnished to all interested on application to the general offices at Worcester, Mass.

The ARABOL MFG. CO., 100 William St., New York, is among the largest manufacturers of starches, sizing compounds, softening oils, softeners and related articles for all branches and varieties of textile manufacture. They are well equipped by modern machinery, laboratory, practical experience and scientific management, to give most satisfactory service to manufacturers. They make it their specialty to meet any particular condition of textile manufacturing.



THERE ARE OVER 300 IMITATIONS OF

RU-BER-OID ROOFING

Some of these imitations look like RU-BER-OID but that is merely on the surface. The roofing buyer cannot see what is underneath, or he would not be fooled in buying goods on their appearance only.

As a house built on a poor foundation cannot last, neither can a roofing founded on poor material give the service expected of it.

Take None but the Genuine

RU-BER-OID

Accent on the "RU" and always spelled with one "B"

Unless the RU-BER-OID Man is shown on the outside wrapper, the roofing is not the genuine RU-BER-OID

KA-LOR-OID
(Colored Ruberoid) ROOFING

RED---BROWN---GREEN

The permanently colored prepared roofing

The ideal roofing for Bungalows, Cottages—in fact suitable for any building where artistic effect is desired.

The Standard Paint Company,

100 William Street, NEW YORK

BOSTON, PHILADELPHIA, CHICAGO,
DENVER, DALLAS

ROYAL PRESS PAPERS AND BOARDS.

We desire to call the attention of our many friends to the fact that these goods are still being made by the same mill and of the same quality as was produced one hundred years ago, and while we believe in up-to-date ideas, we must confess that the "Royal" press papers and boards have not only held their own during this long period of time, but from information received from the many users of these goods in this country, it would appear that the quality and wearing ability of the "Royal" press papers have never been equaled. RICHARDSON BROS., 51 Franklin St., New York, are the sole agents and importers and are thoroughly conversant with the most economical boards for the different styles of finishing, and we believe that those of our friends who study costs, will learn something to their advantage by communicating with Messrs. Richardson Bros.

Among other prominent commission merchants to move to the up-town district of New York is the well known firm of FLEITMANN & CO. This firm has occupied the entire building at the corner of Broome and Worth Streets for a long period. Their new location will be the S. W. corner of 26th Street and Fourth Ave., where they will be prepared to handle a largely increased business in silks, cottons, woolens, linings, gloves, underwear, and billiard cloths.

As is usually the case on the beginning of the New Year, the GROSSER KNITTING MACHINE CO., of 260 West Broadway, New York City, have a new and agreeable surprise in store for their customers and they are sending out a 1913 calendar with one of Dobson's latest artistic reproductions of a Scottish cabin, where "Bobbie Burns and Highland Mary" are sitting near the fire. The warm, rich tones of the painting are emphasized by the three-tone brown mount, which gives harmony to the whole production.

Those who had the pleasure of receiving one of the artistic calendars sent out by this enterprising concern in January, 1912, will at once appreciate the style of artistic beauty with which Mr. Nydegger is remembering his friends this year.

It may not be inappropriate in this connection to mention the fact that the Grosser Company have taken additional space on the fourth floor of the Wool Exchange building, where they expect to install a large exhibition room in which all kinds of automatic and hand knitting machines will be shown in operation.

The JOSEPH DIXON CRUCIBLE CO., of Jersey City, makes the interesting announcement that the selling price of their silica-graphite paint is reduced. They say they make this reduction because the decrease in the price of linseed oil, which is used as the vehicle, enables them to do it, and because it is their aim at all times to give their customers any benefit possible in reduction of price of materials.

This well-known paint which has been the standard for nearly 50 years with leading railroads and manufacturing plants as a maintenance paint, is made in one quality only and is a perfect, long service protector of all exposed steel and metal surfaces."

H. W. BUTTERWORTH & SONS CO., of Philadelphia, Pa., are issuing a holiday souvenir in the form of a "petite" calender and stamp case, which is really a neat little pocket almanac or calendar bound in green seal leather and containing a pocket for carrying stamps.

VIEW OF DRAPER COMPANY COTTAGES, LAKE STREET, HOPEDALE, MASS.

Among the new 1913 calendars which have been received is that sent out annually by the DRAPER COMPANY, of Hopedale, Mass., which has become a fixture in so many mill offices. The design for the calendar back is a new one, inasmuch as the ornamentation around the picture of the Northrup loom has been made over and shows a neat border of cotton bolls. Over the pad is a photogravure picture, which we reproduce herewith, illustrating some of the Draper Company cottages on Lake Street west of the pond. The houses in the foreground were those which were completed in 1911. The makeup of the pad is as usual with one sheet devoted to the formal calendar and the next two sheets showing the days of the week and days of the month with additional space for memorandum purposes.

The Textile Industry of the United States leads the world in the production of low priced colored cotton fabrics of great merit and intrinsic value for the masses.

ONE of the chief contributing causes for the large increase in the production of colored cotton goods in the United States is the introduction of the "Fast Colors."

It was only a few years ago that consumers were afraid to buy colored cotton goods, especially in light shades, such as Blue, Helio, etc., because the colors would not stand up under laundering and exposure to light.

Those who purchased colored cotton goods bought chiefly the dark shades in the hope that the fading would be gradual.

One of the advantages of colored cotton fabrics, besides being light and cool, is the feeling of cleanliness that comes from the fact that they can be laundered many times and without injury to appearance.

Many bought "White" when they would have preferred colored goods, because they knew from sad experience that the colored effects were unsightly after a few launderings.

When Indanthrene dyed cotton goods began to appear on the market a few years ago the trade was naturally reluctant to believe that a really fast color for cotton had at last been found, but the consumers gradually saw the difference and began to realize that colored cotton goods were really worth while, since they could be produced in colors which would practically out-wear the fabric. Gradually this feeling of confidence grew in the minds of consumers generally with the result that a large impetus was given to the colored cotton goods trade.

The end is not yet, but already

America leads in the use of Fast Colors; another reason why American goods merit the preference.

BADISCHE COMPANY

THE DARY RING TRAVELER.

The traveler for ring spinning frames is a small but important part of this equipment. The number of ring travelers used is large, and therefore, a comparatively small difference in price between two types means quite a large difference in the bill for the entire traveler equipment. Nevertheless, the all-important condition in purchasing a ring traveler is the quality of yarn which can be made by its use.

By purchasing properly-designed ring travelers, more yarn can be produced, it will be much smoother in quality, and there will be less waste both in the spinning and weaving departments, for yarn which is smooth and even will give little trouble in the looms. The Dairy ring traveler is manufactured by the DARY RING TRAVELER CO,. of Taunton, Mass. This concern has given careful study to the various methods of making high speed travelers and while this company has introduced modern methods, it has continued to use only the best grades of materials and gives every traveler careful attention with skilled labor. The great care and pains taken make these travelers more expensive than some types, but the results obtained by using these travelers, is said to more than offset the cost.

Extensive experiments have been carried on in a number of first-class mills to determine whether the Dary traveler does produce more and smoother yarn than other makes. It has been compared with several different types and has, it is claimed, shown an increased production and a decrease in waste.

The WOONSOCKET MACHINE AND PRESS CO., of Woonsocket, R. I., announce a new chain drive, invented by the late R. B. Daly, which takes the place of all bevel gears for driving the bobbin shaft on their roving frames. It is claimed to be the greatest improvement made on roving frames in a great many years.

By means of this drive, they have been enabled to increase the speed of the frames and the production has been increased from 10 to 15 per cent. Owing to the superior construction of all parts of the Woonsocket fram this increase of speed causes no extra strain on the machine.

As this chain drive has been in operation in several cotton mills for the last two years, there is no doubt but what the drive is thoroughly practicable and that the claims of the manufacturers are correct.

John A. Abercrombie is no longer connected with the Union Shuttle Co., or the Weld Bobbin & Spool Co., both of Lawrence, Mass., his interests having been purchased by David Brown. Both companies will be under the management of David Brown, as heretofore.

L. F. DOMMERICH & CO., who have for many years been located at 57 Greene St., New York, are removing to new and larger quarters at the N. W. Corner of Fourth Ave. and Twentieth street. This firm is one of the oldest houses in the country and many prosperous mills today owe their start to assistance received from this firm. The additional space afforded at their new location will enable them to handle the much larger volume of business which the increasing general prosperity in the textile trade has brought to them, and also will place them in the position to handle additional accounts to the best possible advantage.

BOOK REVIEWS.

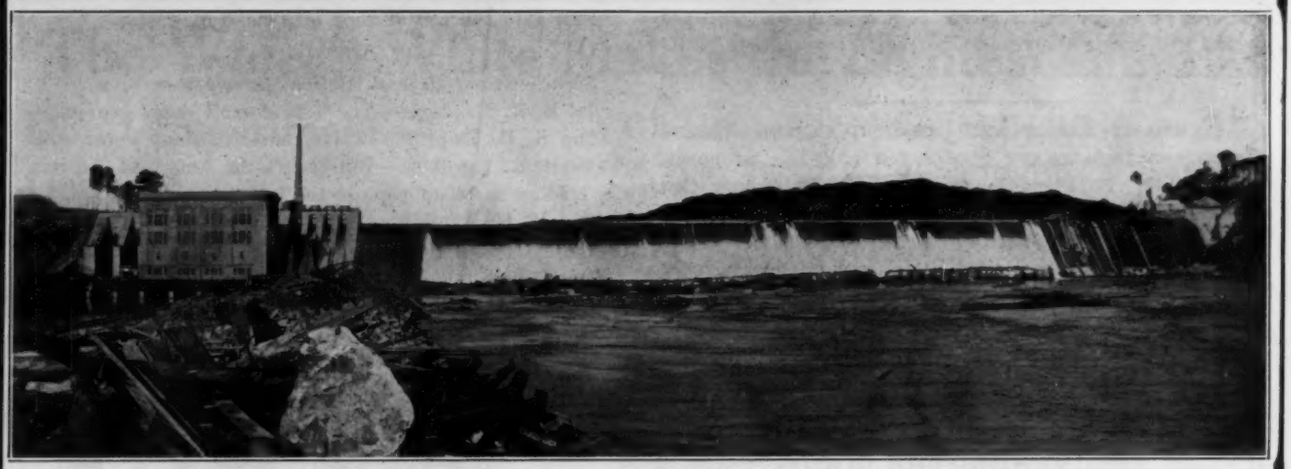
BLEACHING AND DYEING OF VEGETABLE FIBROUS MATERIAL. By Julius Hubner, M. Sc. Tech. (Manchester), F. I. C. Director of the department for bleaching, dyeing, printing and finishing, Victoria University of Manchester. This book also has an introduction by Raphæl Meldola, Professor of Chemistry in the Finsbury Technical College, and past president of the Chemical Society, of the Society of Chemical Industry. 434 pages. 378 illustrations. Published by the D. Van Nostrand Company, 25 Park Place, New York. Price $5.00 net.

This book was designed to fill a want that has arisen in the practical work of nearly every dyer and bleacher, particularly during recent years, that is, a manual on bleaching and dyeing that is comprehensive and up-to-date and at the same time sufficiently concise to make it obtainable at a price within the reach of the student and of the younger bleacher and dyer. In this present manual the author has described all the practicable methods which have been proposed in connection with bleaching and dyeing, so that different methods of applying the same dye stuff are frequently noted. It is of course intended that the reader shall use intelligent consideration in the selection of the process he desires, and not lightly discard a process which he is using successfully in favor of another without the most careful study both practical and theoretical. It does, however, give the reader an opportunity to note practically all the methods for handling such processes, and from these he will then be in a position to select the one best suited for his particular line of work.

In a section dealing with the machinery used in bleaching and dyeing, instead of using photographs of the machines, which are of little educational value, sections of the machines are given in a manner to show the essential working parts. A number of these diagrams are printed in two colors in order to secure greater clearness and intelligibility. While this is a particularly expensive feature, the publishers are to be commended for utilizing it, inasmuch as it makes the diagrams and text very much clearer. Whenever possible the dimensions, speeds, working capacities, and the power necessary for driving the machines are given. This book will meet with an immediate and ready response on the part of the dyers, bleachers and finishers, and as soon as it becomes well known, there is little question that this first edition will become rapidly exhausted.

COTTON FACTS. Published by the Shepperson Publishing Company, Cotton Exchange Bldg., New York City. 236 pages. Flexible cover. Price $1.00.

This is the 37th annual issue of what has now become the standard publication of its kind in the cotton trade. Col. Shepperson, who died about two years ago, first published this book in 1876, since which time it has built itself a place as a comprehensive and yet concise encyclopædia of cotton trade statistics. The present issue in addition to the usual statistics of acreage, consumption, crops, exports, prices, receipts, stocks, mill takings, etc., also contains the census ginning returns, the census production figures for the year 1909 by counties, with comparisons for previous years, and an interesting article on fertilizers and their effects upon cotton production. This article on fertilizers is from the pen of Hon. Martin V. Calvin, secretary of the Georgia State Agricultural Society. A timely article on the Lancashire spinning industry has been prepared by a well-



Recently Completed Power Plant of the Columbus Power Co., at Goat Rock. Ultimate Capacity 40,000 H. P.

Every Manufacturer Should Investigate the Possibilities of
ELECTRIC POWER
It Means Efficiency—Reliability—Economy
We now have five large power plants in operation, thus assuring perfect service.
Columbus Offers the Best Facilities for Manufacturing Industries to be Found in the South. Write for Information.

The Columbus Power Company,
COLUMBUS, ---- GEORGIA

ARE YOU USING "AMERICAN ANILINE COLORS?"

If not, you had better send us an inquiry. It will be of benefit to you. We manufacture a full line of Aniline Colors for Textiles.

SCHOELLKOPF, HARTFORD & HANNA COMPANY, Buffalo, N.Y.

Selling Agents:—NATIONAL ANILINE & CHEMICAL CO.

New York	Boston	Philadelphia	Chicago
Milwaukee	Minneapolis	Cincinnati	Buffalo
Kansas City	Hartford	Providence	

ANTIMONY LACTATE.

¶ As has been widely noted there has been a very sharp advance in the price of Antimony Oxide. Without dilating on the cause of this advance it is of especial importance to users of Antimony products as mordants because they, too, will doubtless advance. In the average Antimony product used for mordanting only a comparatively small percentage of the Antimony Oxide it contains is available, the rest is lost, because of the excessive acidity of the bath.

¶ All the Antimony Oxide in ANTIMONY LACTATE is available, hence it is particularly the mordant to use with an advancing Antimony Oxide market.

AVERY CHEMICAL CO., 88 Broad St., BOSTON

known Lancashire authority. This edition of the book has been arranged for better reference and completely indexed which will enable the reader to take full advantage of its contents.

DOCKHAM'S REPORT AND DIRECTORY OF THE JOBBING TRADE AND DEPARTMENT STORES FOR 1912-13. 80 pages. Price $1.00. Published by the Dockham Publishing Co., 6 Beacon Street, Boston, Mass.

This interesting directory of department stores and jobbing trade of both United States and Canada includes over 4,300 buyers. The lines of each jobbing firm are given in full. The list is arranged alphabetically by states, cities and firms. To those interested in reaching the buyers indicated, this directory will be found both convenient and valuable.

DELIVERING THE GOODS.

The following drama in five acts is reproduced from the *Cord Age*, a little magazine devoted to more rope and published by the AMERICAN MFG. Co., Noble and West Sts., Brooklyn, N. Y.

ACT I.

Scene I: Transmission Rope Department, sixth floor of "American" Manufacturing Co.'s administration building, Greenpoint, Brooklyn, N. Y., City.

Time—Ten a. m., Thursday, July twenty-fifth, nineteen-twelve.

Transmission Rope Man (at telephone)—Hello!

Voice (from far away)—This is Mr. Davis of the Davis Cotton Mills, North Adams, Mass.

Transmission Rope Man—Good morning, Mr. Davis.

Mr. Davis (anxiously)—Can you rush 4,000 ft. of 1¼" dia. "American" transmission rope in one continuous length to our mill?

Transmission Rope Man—Certainly, Mr. Davis, we'll ship it by first express.

Mr. Davis—But the first express delivery in North Adams is at 9 a. m. tomorrow morning; we've had an accident which destroyed the rope on one of our main drives and can't start up until we get the new rope; we want to start running again tomorrow morning at 7 o'clock if it is possible.

Transmission Rope Man—We will see what we can do to help you out.

Mr. Davis—Thank you, let me know what I can expect.

Scene II: Same as Scene I. Time one hour later.

Transmission Rope Man (at telephone)—Get me Mr. Davis of the Davis Cotton Mills, North Adams, Mass.

Mr. Davis—Hello! What can you do?

Transmission Man—I've good news for you—the American Express Company has received permission from the railroad company to carry your coil of rope in the combination club-baggage car which leaves New York at 3:38 this afternoon, arriving at North Adams shortly after 8 tonight. We will see to it that your coil gets to the train on time.

ACT II.

Scene—Fourth avenue, New York—An auto carrying a representative of the American Manufacturing Co., as well as four thousand feet of 1¼ inch dia. "American" transmission rope is making a broad red streak on the landscape.

A Cop—On the corner of 28th St.—Opening his eyes, for the love of Mike what's that!

Auto—Honk! Honk!

Exit auto and coil of rope in a cloud of dust.

ACT III.

Scene—Grand Central Station, three-fifteen p. m.

1st R. R. Employee—The 3:28 doesn't carry express.

2nd R. R. Employee—Nope, never has and never will.

1st R. R. Employee—But there's the American Express Co. loading a coil of rope in the baggage car!

2nd R. R. Employee—Well, what do you know about that?

1st R. R. Employee—What are we coming to when fast passengers are allowed to lug along bundles of rope the size of that?

Guard—All aboard for———————— and North Adams.

(Exit the 3:28 and 4,000 ft. of "American" transmission rope.)

ACT IV.

Scene—Before the gates of Davis Cotton Mills, North Adams, Mass., early in the morning of July twenty-sixth, nineteen-twelve—hundreds of mill hands are seen approaching.

1st Mill Hand—That was a bad accident yesterday—I was afraid we'd be laid off for three or four days.

2nd Mill Hand—So was I. I heard they had to get the rope from New York.

3rd Mill Hand—There must have been some tall hustling to get it out here in time to put it on and have the mill ready to start at 7 o'clock.

ACT V.

Scene—Same as Act I. Morning of July twenty-seventh.

Transmission Rope Man—Leaning back in chair and reading letters:

AMERICAN MANUFACTURING CO.,
Noble and West Sts., Brooklyn, N. Y.

Gentlemen:

We received the rope on schedule time, and were able to get it on during the night so that we are running as usual this morning.

Your special attention in the matter is much appreciated and has been of material benefit to us and we expect, in the near future, to send you further orders for "American" transmission rope. Yours very truly,

DAVIS COTTON MILLS.

This drama is for those who can read between the lines. Starting in tragedy and ending in comedy, it teaches the important lesson of doing business with a company which not only carries an emergency stock to supply any demand, but which exerts every effort to help its customers when they are in trouble.

Note: The names in the above story are fictitious, but this exact incident took place recently in a mill equipped with 130,000 spindles and 2,900 looms. The American Mfg. Co. will gladly supply the correct name of the concern to any who may be interested.

THE MODOC COMPANY, INC., of Fernwood, Pa., who have one of the largest and best equipped sizing factories in the country, report an increasing interest in their improved sizing, which they find is giving satisfaction in all directions. Their ample facilities and adequate force permit them to make prompt shipments of scientifically prepared sizings and softeners for all purposes.

"The Whitest White Makes the Lightest Light"

Don't Experiment—
Use

Glidden's

DAY LITE

Mill White

Glidden's Day-Lite Mill White will make your factory light, bright and sanitary and insure real efficiency and real economy of production. It is the Mill White that **Stays White.** It is made in two finishes, gloss and flat. It is easily applied and has splendid brushing and flowing properties.

It positively will not chip or flake and it will not turn yellow. It is a sanitary and waterproof white that can be washed down with a hose without detriment.

Write us for a free working sample and a copy of our booklet.

The Glidden Varnish Company,

Specialty Dept.—Cleveland, Ohio

Factories:—Cleveland, Ohio; Toronto, Canada. **Branches:—New York, Chicago, London.**

LaGrange Is A Wonderful City

Within and around its borders are to be found wealth, aristocracy, tremendous and aggressive business and remarkable natural and railroad advantages.

Its seven cotton mills use 250 bales of cotton per day and pay out in salaries $150,000 per week.

It has two of the oldest colleges for women in the world, having an enrollment of 400 or 500 students.

LaGrange is one of the most attractive residence cities in America, combining in a peculiar way manufacturing and residential advantages.

LaGrange is just entering the biggest building era in its history. A quarter million of construction work is now under way.

The town wants more factories and more citizens. Local citizens will join with new-comers in financing new enterprises.

Write for fuller information to .

Chamber of Commerce, LaGrange, Ga.

42 STORIES OF SOLID COMFORT
IN THE HEART OF NEW YORK CITY
HOTEL YORK
(STRICTLY FIREPROOF)
Cor. of 36th Street and 7th Avenue
ONE SHORT BLOCK TO BROADWAY
2 Minutes Walk from New Pennsylvania Railroad Station; 10 Minutes from Grand Central Terminal
Within 10 Minutes Walk of 30 Leading Theatres, Newest and Largest Department Stores and Fashionable Shops
Accommodations Better Than Rates Indicate
Attractive Rooms $1.50 to $2.00 with Bath Privilege
Attractive Rooms $2.00 to $4.00 with Private Bath
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WILLIAM ISELIN & Co., the well known commercial bankers, and foreign and domestic commission merchants, are removing their offices from the former location at Greene and Canal streets, New York, to Fourth Ave. and 26th Street, New York. This new location uptown will be advantageous in many ways and will not only place this firm in a position to handle in a better manner its present existing accounts, but will also allow them to extend their different departments for silks, satins, velvets, underwear, hosiery, dress goods, woolens, etc., and provide for a large additional amount of business which they were unable to cope with in their old quarters.

THE MODOC COMPANY, INC., of Fernwood, Pa., are considering the advisability of turning over the sale of their sizing and softeners to some responsible agent, who would have entire charge of the Southern territory. Heretofore they have sold their own goods direct through their own salesmen. The Modoc Company would be glad to receive communications relative to this agency from interested parties.

L. ERNSTEIN & BROS., the well known importers and commission merchants formerly at 56 Greene St., New York, have removed to 345 Fourth Ave., Cor. 25th Street. This firm makes a specialty of ribbons, siks, chiffons, velvets and linings.

MILL NEWS

Notices of mill projects, additions or Improvements are solicited for this degartment

ALABAMA.

ATHENS. The Fulton Cotton Mills are to install 80 forty-inch, and 48 thirty-six-inch looms. An addition 125 by 152 feet is now being built. They expect to start the new equipment into operation about the first of march.

SHAWMUT. The Shawmut Cotton Mills have built 20 new cottages for operatives.

ARKANSAS.

HELENA. It is reported that the Premier Mills of Barton, Ark., are to build a plant at this place.

CONNECTICUT.

JEWETT CITY. The Jewett City Textile Novelty Co. is enlarging its plant with the erection of an addition. New machinery will be installed as soon as this addition is completed.

FLORIDA.

ALACHUA. Dr. J. L. Cloud, of the Board of Trade, and others are interested in a plan which promises to be successful for the organization of a company to build a cotton mill at this place. It is proposed to have a capital stock of $250,000 and provide a plant equipment with the machinery necessary for spinning sea island cotton, much of which is grown in this county.

GEORGIA.

COLUMBUS. The annual meeting of the Columbus Mfg. Co. was held in December in the offices of the company. At the meeting of the directors which followed that of the stockholders the semi-annual dividend of 3 per cent was declared and the officers for the ensuing year were named as follows: F. B. Gordon, Pres.; Chas. H. Utley, Treas.; W. S. Dismutes, Secy.

LAFAYETTE. The LaFayette Cotton Mills are planning to change from steam to electric power.

ROSSVILLE. The Richmond Hosiery Mills of this place have increased their capital stock $100,000 making the total capital $450,000.

QUITMAN. At a recent stockholders' meeting of the Atlantic & Gulf Mills of this place, J. W. Spain, the president of the company, tendered his resignation which was accepted. W. W. Walker former vice president was appointed to fill the vacancy. These mills are capitalized at $250,000 and manufacture combed sea island yarn.

SAVANNAH. It is reported that efforts are being made by the industrial agents of the Seaboard Air Line to locate a large cotton mill somewhere in the vicinity of Savannah. The same capitalists who are interested in the $250,000 plant at Alachula. Fla., are also interested in this section and if a satisfactory arrangement for a site and transportation facilities can be made, they are prepared to make an investment here.

KENTUCKY.

LOUISVILLE. The Eagle Cordage Mills have acquired the Overman & Trainor Co., at Covington. The plant will be started early this year by the new owners.

LOUISVILLE. The Puritan Cordage Mills, Inc., of this city, which has been using electric power for some time, report the experiment to have been successful in many respects. It has been found that the expense for power has been smaller under the new system than when the company operated a steam plant and generated its own power. The Louisville concern has undoubtedly profited by the unusually low rates which have been quoted to large power consumers on account of competition for business being waged by two electric companies in the field in Louisville.

LOUISIANA.

NEW ORLEANS. It is reported that a combination of manufacturers and real estate men are to build a 15 story building exclusively for manufacturing purposes. It is proposed that all manufacturers to occupy this building shall be manufacturers of collars, shirts and light clothing. Nine firms have pledged themselves to take floor space in the new building, and ways and means are now being discussed to finance the proposition. J M. Noar of the Noar Neckwear Co., is one of those backing the enterprise.

MARYLAND.

CUMBERLAND. Twenty new standard knitting machines are to be added to the equipment of the Parker Hosiery Mills in a short time.

NEW HAMPSHIRE.

MANCHESTER. A short time ago the Amoskeag Mfg. Co. made an offer whereby any operative, who had been in its employ for five years, could build a home on one of the house lots in the section near the plant. The corporation being willing to take a mortgage on the land, one half of the note to be cancelled at the expiration of five years and at the end of ten years a clear title will be given to the land. Several employees have taken advantage of the offer and the first houses have just been completed.

NORTH CAROLINA.

CHARLOTTE. E. A. Smith Mfg. Co., with main offices in this city has awarded its contract for looms to the Whiton Machine Works. George V. Crisson & Co., of Philadelphia, secured the contract for the power transmission equipment. The new building is at Rhodhiss, N. C.

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PHILADELPHIA and CHICAGO.

HILLSBORO. The Bellvue Mfg. Co., whose dye house was recently destroyed by fire are rebuilding same.

CONCORD. The Franklin Mills expect to have the new addition ready for operation in a short time. The machinery is now being put in. 38 new cottages for the operatives have been built.

CHARLOTTE. The new spinning mill of the Johnson Mfg. Co., has been completed and the machinery all installed. The mill having recently started up. It contains 5,000 spindles for the manufacture of No. 8 yarns. Contracts for motors, etc., was given to the General Electric Co. It will employ approximately 100 hands.

LILESVILLE. It is reported that interest is being aroused in the organization of a company to build a cotton mill at this place. A capital of $250,000 is proposed whch it is hoped to raise before the first of the year.

LEXINGTON. It is reported that the Decotah Mills at this place will add more machinery next year. This will probably consist of about 4,800 spindles and 200 looms.

HENDERSONVILLE. It is reported that the new Friece Hosiery Mills of this place which was started last July will soon double its capacity. The capacity of the plant now is 240 dozen pairs of hosiery per day.

CHAPEL HILL. The Durham Hosiery Mills of this place are being equipped with an electric drive. The new equipment consists of a 750 K. V. W. Curtis turbo-generator with a 7 K. W. transformer and switchboard for application of the power throughout the mill. Eleven motors will be employed, ranging from 25 to 100 H. P. capacity. All of this apparatus is being furnished and installed by the General Electric Co.

SALISBURY. The two story addition to the Salisbury Cotton Mills is nearly completed. The addition will be used as a finishing department. The Salisbury Cotton Mills manufacture principally colored goods.

OHIO.

COLUMBUS. A knitting mill is under construction at the state penitentiary and will soon be in operation. It is estimated that the daily output will average 600 suits of underwear.

PENNSYLVANIA.

PHILADELPHIA. B. J. Medoff is planning a three-story factory 60 feet by 90 feet on tthe southwest corner of 7th and Green streets for the Diamond Knitting Mills.

MILTON. The West Branch Knitting Co., of this place, has recently dismantled its spinning mill and installed the machinery in the underwear department which is now located in a new building. This building will have an equipment also of 40 knitting machines and 100 sewing and finishing machines. These addtions will enable the company to increase its capacity to 500 dozen per day.

RHODE ISLAND.

PROVIDENCE. The Priscilla Worsted Co., is to remove to Thornton in the early future. It is planned to vacate the Eagle Street plant and the company has recently leased the British Hosiery Company's old mill at Thornton.

SOUTH CAROLINA.

FORT HILL. The Fort Hill Mfg. Co. are to have a new warehouse 50 by 100 feet, two stories high to be built on the rear of the present mill. The contract has already been awarded for the work.

ABBEVILLE. It is reported that the Abbeville Cotton Mills expect to increase their equipment by 25,000 spindles.

IVA. It is reported that the Jackson Mills of this place will install additional spinning machinery. The warehouses for cotton in connection with the mills are also being enlarged and a suction cotton conveyer from the warehouse to the picker room is also being installed.

WALHALLA. The Hetrick Hosiery Mill of this place are installing a box making plant for the manufacture of paper boxes used in packing their product for the market. The machinery is being furnished by the M. B. Knowlton Machinery Co., of Rochester.

TENNESSEE.

KNOXVILLE. The Brookside Mill, of Knoxville, have just awarded a contract for the construction of an additional building providng space for new machinery which the company intends to install. The machinery will probably consist of approximately 200 new looms.

NASHVILLE. It is announced that the Chilhowee Hosiery Mills have been incorporated at this place. The concern will establish a plant with a daily capacity of 600 dozen pairs of hosiery.

TEXAS.

SAN ANTONIO. Prominent Texans are advocating the building of more mills in Texas. They are showing that out of three to four million bales of cotton raised annually in Texas, only about 47,000 bales are consumed for the purpose of making cloth by the Texas mills. Texas boosters are noted for their hustle and boosting ability and their efforts for success are being watched with interest

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ALPHABETICAL INDEX TO ADVERTISERS

Aberfoyle Mfg. Co.....181
Acme Knitting Machine & Needle Co. 25
Acme Steel Goods Co. 15
Alabama Engraving Co. 152
Allis-Chalmers Co. 185
American Audit Co. ....17 & 161
American Bond & Mortgage Co. 33
American Dyewood Co. 197
American Felt Co. .....39 & 42
American Laudry Mch. Co... 5
American Machine Co. 183
American Mfg. Co. 176
American Moistening Co. ... 28
American Soap & Washoline Co. 198
American Supply Co. 151
American Tool and Mach. Co.194
Amory Brown & Co. 167
Amoskeag Mfg. Co. 168
Arabol Mfg. Co. 184
Arlington Mills 173
Atlanta Stamp & Stencil Works 153
Avery Chemical Co. 141

Badische Co. 189
Bailey-Lebby Co. 180
Barber-Colman Co. 16
Barrett Mfg. Co, ...135
Barrell Co., William L.....154
Bay State Storage & Warehouse Co. 16
Beer, H. & B. 196
Berlin Aniline Wks. 195
Birch Bros. 17
Bliss, Fabyan & Co.....169
Boomer & Boschert Press Co. 27
Borden Co., M. C. D.....157
Bosson & Lane 194
Bowser & Co., Inc., S. F.....198
Bradley Mfg. Co., A. J..... 33
Brown Paint Co., Chas. H... 33
Bull, Wm. C..... 15
Butterworth & Sons Co., H. W. .....182 & 183
Butz, W. D. 15

Cameron Septic Tank Co....196
Camp Machine Co. 44
Cannon Mills Co. 150
Carbolineum Wood Preserving Co. 44
Carpenter & Co., The Geo. P..174
Cary Mfg. Co. 33
Cassella Color Co. 188
Chesapeake Belting Co. 34
Claflin Co., H. B. 158
Clarage Foundry & Mfg. Co...176
Clark Co., The Geo. P. 15
Clayton & Bentley Co. 24
Clift & Goodrich.....165
Cocker & Co., M. 15
Columbus Power Co.....141
Conant & Co., J. E. 156
Cone, T. H. S.....155
Cortright Metal Roofing Co..145
Cramer, Stuart W. 18
Crocker-Wheeler Co. 198
Crompton & Knowles Loom Works 7

Dary Ring Traveler Co. 12
DeHaven Mfg. Co. 30
Deming Co. 180
Detroit Graphite Co. 28
Dixon Crucible Co., Jos. 178
Dixon Lubricating Saddle Co. 30
Draper Co. .....2 & 3
Dufur & Co. 30

Easton & Burnham Mch. Co... 6
Economy Eng. Co. 27
Elect. Smeltering & Aluminum Co. 44
Emmons Loom Harness Co..147
Eureka Fire Hose Mfg. Co.... 28

Fales & Jenks Mch. Co..... 6
Farbenfabriken of Elberfeld Co. .....44 & 193
Farbwerke-Hoechst Co. 189
Fawcett, Hughes 154
Felton & Son Co., S. A..... 14
Felton Brush Co., D. D. 30
Foster Engineering Co.....185
Foster Machine Co..10 & 11 & 202

Garland Mfg. Co..... 44
Geisenheimer & Co.....194
General Electric Co. 43
Glenlyon Dye Works.....194
Glidden Varnish Co., The....143
Graphite Lubricating Co.....177
Graton & Knight Mfg. Co.... 37
Graves Co., Frank B.....175
Grinnell, Willis & Co. .153 & 165

Hardy, Frank A. 202
Harding, Tilton Co.....160
Hart, Charles 27
Haskell-Dawes Mch. Co..... 16
Henderson & Co., Chas. F....154
Hess Bright Mfg. Co. 31
Hill, Nicholas S., Jr.....196
Hoffman & Co., Arnold.....191
Hoffman, Geo. W. 202
Hooker Electro-Chemical Co. 34
Hotel Rittenhouse 150
The St. Charles 12
Hotel Tuller 198
Hotel Victoria 198
Hotel York 144
Howard & Bullough, American Machine Co. 133
Howard Clock Co., E.....202
Howard Dustless Duster Co.. 16
Howard & Morse 177
Hungerford & Terry, Inc. ...194
Hussa, Theo. F. 28
Hussong Dyeing Machine Co.201
Hyatt Roller Bearing Co..... 29
Hydraulic Press Mfg. Co..... 27

International Cotton Mills Corp. 174
Iselin & Co., Wm. 170

Jenckes Knitting Mach. Co.. 25

Kalle & Co., Inc. 190
Kellogg & Co., E. H..... 14
Kennard House 180
Kilburn, Lincoln & Co..... 12
Klipstein & Co., A. 187

LaGrange Chamber of Commerce 143
Lane & Co., J. H.....166
Lawrence & Co.....163
Leigh & Butler 12
Lestershire Spool & M'f'g Co. 8
Leiman Bros. Co. 36
Lindley, Geo. W..... 8
Lindsay, Hyde and Co..... 15
Lippincott, A. C. 198
Logemann Bros. Co.....145
Lombard Iron Works & S. Co. 177
Lorimer's Sons Co., Wm. H. .....153 & 152

Matthews, J. Merritt, Ph. D..196
Mason Machine Works..... 19
Mayes, J. H. 6
Mayo Mach. Co., Geo. D..... 14
Mellox Furnace Engineering Co. 30
Merrow Machine Co. 17
Metallic Drawing Roll Co.... 13
Mill News Printing Co..... 25
Minot, Hooper & Co.....166
Modoc Co. 197
Morris Machine Works.....177
Morris & Co. 44

N. Y. and N. J. Lubricant Co.176
Nason Mfg. Co. 186
Northeastern Co. 44
Norwood Engineering Co.....199
Nye & Tredick Co. 17

Oneida Steel Pulley Co. 186

Palmer Co., I. E. 14
Parker Cotton Mills Co.....158
Parker, Wilder & Co.....163
Paulson, Linkroum & Co. .....154 & 160
Pearson, Jos. T..... 12
Pa. Oil Soap & Chem. Co....152
Pettes & Randall Co. 30
Phila. Drying Mach. Co.....202
Phila. Textile Mchy. Co...40-41
Phila. Yarn Co. 152
Poor & Co., E. E. 164
Potter & Johnson Mch. Co... 6
Powell Co., William.....176
Power Specialty Co.....186
Psarski Dyeing Mach. Co....201
Putnam Hooker Co. 154

Ramsey, Geo. W. 152
Ray and Co., Wm.....155
Reliance Machine Works.... 27
Richards, Atkinson & Haserick 153
Richardson Bros. 169
Riley Co., C. E.....167
Riley & Co., P. J.....201
Robertson & Son Co., James L. 34
Saco-Lowell Shops..Front Cover
Salkeld & Bros., A. D.....154
Sargent's Sons Corp., C. G...199
Sayward, Henry E. 153
Scaife & Sons Co., Wm. B...198
Schnitzler, Chas. H..... 30
Schofield's Sons, J. S.....186
Schofield Co., Wm. 16
Scholes, John 12
Schoellkopf, Hartford & Hanna Co. 145
Scholler Bros. Co. 154
Scott & Williams, Inc. 14
Seydel Mfg. Co. 150
Shambow Shuttle Co. 9
Sirrine, J. E. 196
Slater & Son's Co., S.....170
Smith, Hogg & Co., ...164
Snyder & Raub 190
Solvay Process Co. 192
Southern Cotton Mills & Commission Co. 153
Southern Engraving Co. 28
Southern Ry. 150
Spiker, W. C. 196
Stafford & Holt..... 25
Stafford Co. 20-21
Stafford & Co., G. A. ....153 & 171
Standard Bleachery Co. 22
Standard Crayon Mfg. Co...30
Standard Paint Co.....137
Steel Heddle Mfg. Co. 148
Stevens, Manuel J. 44
Stevens & Co., J. P.....172
Stevenson Mfg. Co. 179
Stewart & Sons 12
Stuart Howland Co. 153
Sykes & Co., Walter F. 198

Taylor, James 151
Taylor, Clapp & Co.....161
Textile Finishing Mchy Co...200
Thurston & Son., A. G..... 12
Tolar & Hart.....154
Tolhurst Machine Works.....201
Toomey, Frank 151
Townsend & Co., E. M. 171
Turner, Tucker & Co. 146
Turner Co., J. Spencer.....174

U. S. Gutta Percha Paint Co. 26
U. S. Hoffman Co. 32

Vietor and Achelis Co., Fred'k.157

Walsh & Weidner Boiler Co..180
Weller, Francis R. 196
Weimar Bros. .....153 & 168
Wedderburn, Jr., Alex J.....152
Wellington, Sears & Co.....172
Westcott & Sons, A. A..... 16
Westinghouse El. & Mfg. Co. 38
Westinghouse Machine Co. .. 38
Whitinsville Spinning Ring Co. 8
Whiton Machine Co., D. E...177
Whitman & Co., Clarence....162
Wildman Mfg. Co. 23
I. B. Williams & Sons 35
Willis & Co., Grinnell.....153
Woodward, Baldwin & Co. 153 & 162
Woonsocket Mch. & Press Co. 6

Zurn Co., O. F. 202

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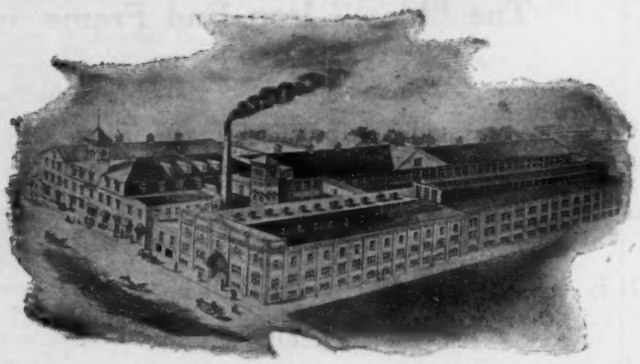

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CLASSIFIED INDEX TO ADVERTISERS.

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Klipstein & Co., A.
Schoellkoff, Hartford & Hanna Co.
Sykes & Co., Walter F.

Anti-Chlorine.
Bosson & Lane.
Seydel Mfg. Co.

Architects and Engineers.
Cameron Septic Tank Co.
Hill, Jr., N. J.
Saco-Lowell Shops.
Spiker, Wm. C.
Sirrine, J. E.
Snyder & Raub.
Weller, Francis R.

Attorney—Patent.
Geo. W. Ramsey.

Auctioneers.
Conant and Co., J. E.

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American Audit Co.

Bale Band Buckles.
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Cary Mfg. Co.
De Haven Mfg. Co.

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Butterworth & Sons Co., H. W.
Philadelphia Drying Mchy. Co.

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Draper Co.
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Saco-Lowell Shops.

Banding Machinery and Bandings.
Cary Mfg. Co.
Draper Co.

Baskets.
Hardy, F. H.
Morris & Co.

Beaming Machines.
Crompton & Knowles Loom Works.
Entwhistle & Co., T. C.

Belting.
American Supply Co.
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Link Belt Co.

Belt Dressing.
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Glenlyon Dye Works.
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Bleaching Kiers.
Butterworth & Sons Co., H. W.
Philadelphia Drying Machy. Co.
Textile Finishing Machinery Co., The

Bleaching Machinery.
Birch Bros.
Butterworth & Sons Co., H. W.
Philadelphia Drying Machy. Co.
Textile Finishing Machinery Co., The
Tolhurst Machine Works.

Bleaching Materials.
Bosson & Lane.
Hooker Electro-Chemical Co.
Seydel Mfg. Co.
Solvey Process Co., The

Blowers.
Leiman Bros.

Bobbins.
Draper Co.
Foster Machine Co.
Shambow Shuttle Co.

Boards—Form.
Bull, Wm. C.
W. D. Butz.
Pearson, Jos. T.

Boilers.
Lombard Iron Works & Supply Co.
Nason Mfg. Co.
Schofeld's Sons Co., J. S.
Toomey, Frank
Walsh & Weidmer Boiler Co.

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Seydel Mfg. Co.

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Acme Steel Goods Co.
Cary Mfg. Co.

Brokers.
A. Wunnenberg.

Brushes.
M. Cocker & Co.
Felton Co., D. D.
Felton & Son Co., S. A.
Hardy, Frank H.

Carbonizing Machines.
Philadelphia Drying Machy. Co.
Phila. Textile Mchy. Co.
Sargents Sons & Co., C. G.
Textile Finishing Machinery Co., The

Cards.
Howard & Bullough.
Mason Machine Wks.
Potter & Johnson Mch. Co.
Saco-Lowell Shops.
Whitin Machine Works.

Card Clothing.
Bigelow, W. H.
Leigh & Butler.
Howard & Bullough.
Saco-Lowell Shops.
Whitin Machine Wks.

Card Strippers.
Smith, Camp Machine Co.

Carpet Machinery.
Crompton & Knowles Loom Works.
Philadelphia Drying Machy. Co.
Phila. Textile Mchy. Co.
Textile Finishing Machinery Co., The

Casters.
Clark Co., The Geo. P.

Chambers of Commerce.
Larange Chamber of Commerce

Chemicals.
Arabol Mfg. Co.
Avery Chemical Co.
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Eastern Chemical Co.
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CLASSIFIED INDEX TO ADVERTISERS—Continued.

Clocks—Employees' Time.
Pettes & Randall Co.

Clocks—Tower.
Howard Clock Co., E.

Clocks—Watchman's.
Birch Bros.
Pettes & Randall Co.

Cloth.
Amoskeag Mfg. Co.

Cloth Cutters—Electric.
Wildman Mfg. Co.

Cloth Presses.
U. S. Hoffman Co.

Cloth Room Machinery.
Birch Bros.
Saco-Lowell Shops.
Textile Finishing Machinery Co., The
Wildman Mfg. Co.

Colors.
Avery Chemical Co.
Cassella Color Co.
Farbenfabriken of Elberfeld Co.
Farbwerke-Hoechst Co.
Geisenheimer & Co.
Kalle & Co.
Klipstein & Co., A.
Sykes & Co., Walter F.

Cotton Cloth Commission Merchants and Dealers.
Amory, Browne & Co.
Arlington Mills.
Barrell Co., Wm. L.
Bliss Fabyan & Co.
Borden & Sons, M. C. D.
Claflin Co., H. B.
Clift & Goodrich.
Cone, T. H. S.
Fawcett, Hughes.
Frank B. Graves Co.
Grinnell, Willis & Co.
Harding Tilton & Co.
International Cotton Mill Corp.
Iselin & Co., Wm.
Lane & Co., J. H.
Lorimer's Sons Co., Wm. H.
Lawrence & Co.
Minot Hooper & Co.
Parker & Wilder Co.
Paulson, Linkroum & Co.
Edward E. Poor & Co.
Putnam, Hooker & Co.
Quilhot & Son, S.
Ray & Co., Wm. B.
Richardson Brothers.
Riley Co., C. E.
Slater & Sons Co., S.
Smith, Hogg & Co.
Southern Cotton Mills & Co.
Stafford & Co., G. A.
Stevens & Co., J. P.
Taylor Clapp & Co.
Tolar & Hart.
Townsend & Co., E. M.
Turner Co., J. Spencer.
Victor & Achella, Fredk.
Wellington Sears & Co.
Weimar Bros.
Whitman Co., Clarence.
Whitman & Co., Wm.
Willis & Co., Grinnell.
Woodward, Baldwin & Co

Cotton Mills.
Parker Cotton Mills Co.
Cannon Mills.

Condensers.
Dean Bros. Steam Pump Works.

Consulting Chemists.
J. Merritt Matthews.

Controllers—Feed Water.
Foster Engineering Co.

Conveying Machinery.
Bailey-Lebby Co.
Phila. Drying Machy. Co.
Phila. Textile Mchy. Co.
Schnitzler, Chas. H.

Cordage.
American Mfg. Co.
Carpenter & Co., Geo. B .

Cordage Machinery.
Saco-Lowell Shops.
Textile Finishing Machinery Co., The

Cotton Dealers and Brokers.
Beer, H. & B.
Henderson & Co., Chas. F.
Richards, Atkinson & Hasrick.
Tolar & Hart.

Cotton Mill Machinery and Equipment.
Bailey-Lebby Co.
Crompton & Knowles Loom Works.
Draper Co.
Foster Mch. Co.
Howard & Bullough, American Machine Co., Ltd.
Mason Machine Works.
Mayes, J. H.
Metallic Drawing Machinery Co.
Phila. Textile Mchy. Co.
Saco-Lowell Shops.
Schofield Co., Wm.
Taylor, James.
Toomey, Frank.
Textile Finishing Machinery Co., The
Whitin Machine Wks.
Woonsocket Mach. & Press Co.

Cotton Softeners.
American Soap & Washoline Co.
Arabol Mfg. Co.
Bosson & Lane.
Metz & Co., H. A.
Modoc Co., The
Penna. Oil, Soap & Chem. Co.
Seydel Mfg. Co.
Zurn Co., The O. F.

Cotton Waste Machinery.
Howard & Bullough.
Kitson Machine Shop.
Sargent's Sons Corp., C. G.
Schofield Co., Wm.

Crayon.
Standard Crayon.

Culverts.
Dixie Culvert & Metal Co.

Damper Regulators.
Nason Mfg. Co.

Directories.
Davison Publishing Co.

Dobby Chains.
Crompton & Knowles Loom Works.

Drawing Frames.
Howard & Bullough.
Mason Machine Works.
Saco-Lowell Shops.
Whitin Machine Works

Drawing Rolls—Metallic.
Metallic Drawing Roll Co

Drying Machinery.
Butterworth & Sons Co., H. W.
Philadelphia Drying Machy. Co.
Philadelphia Textile Machy. Co.
Sargent's Sons Corp., C. G.
Textile Finishing Machinery Co., The

Duck.
Barrell Co., Wm. L.
Carpenter & Co., Geo. B.
International Cotton Mills Corporation.
J. Spencer Turner.

Duck Baskets.
Morris & Co.

Dust Collectors.
Phila. Drying Machy. Co.

Dyers and Bleachers.
Glenlyon Dye Works.
Standard Bleachery Co.

Dyeing, Bleaching and Fnishing Machinery.
Butterworth & Sons, H. W.
Hussong Dyeing Machine Co.
Lorimer's Sons Co., W. H.
Phila. Drying Machy. Co.
Phila. Textile Machy. Co.
Psarski Dyeing Machine Co.
Textile Finishing Machinery Co., The
Tolhurst Machine Works.

CLASSIFIED INDEX TO ADVERTISERS—Continued.

Dye Sticks.
Phila. Drying Machy. Co.

Dyestuffs.
Aberfoyle Mfg. Co.
American Dyewood Co.
Avery Chemical Co.
Badische Co.
Berlin Aniline Works.
Bosson & Lane.
Cassella Color Co.
Electric Smelting & Aluminum Co.
Farbenfabriken of Elberfeld Co.
Farbwerke-Hoechst Co.
Geisenheimer & Co.
Kalle & Co.
Klipstein & Co., A.
Sykes & Co., Walter F.

Dynamos and Motors.
Allis-Chalmers Co.
Crocker-Wheeler oC.
General Electric Co.
Westinghouse Electric & Mfg. Co.

Electrical Machinery and Supplies.
Allis-Chalmers Co.
Crocker-Wheeler Co.
General Electric Co.
Stuart-Howland Co.
Westinghouse Electric & Mfg. Co.
Walsh & Weidner Boiler Co.

Elevators.
Economy Eng. Co.

Elevators—Portable.
Economy Eng. Co.

Engineers, Consulting.
Cameron Septic Tank Co.
Saco-Lowell Shops.
Sherman, W. F.
Sirrine, J. E.
Snyder & Raub.
Spiker, Wm. C.
Weller, Frances R.

Engineers, Furnace.
Mellor Furnace Engng. Co.

Engines.
Lombard Iron Works & Sup. Co.
Morris Mch. Works.
Schofield's Sons Co., J. S.
Toomey, Frank.
Walsh & Weidner Boiler Co.

Engravers.
Alabama Engraving Co.
Southern Engraving Co.

Engravers and Stationers.
Alabama Engraving Co.

Extractors—Hydro.
American Tool & Mch. Co.
Tolhurst Machine Works.

Fans—Power.
Clarage Fdry. & Mch. Co.
General Electric Co.
Howard & Morse.
Phila. Drying Machy. Co.
Phila. Textile Machy. Co.
Seymour, J. M.
Westinghouse Electric & Mfg. Co.

Fans—Exhaust.
Clark Co., The Geo. P.
Howard & Morse.
Phila. Drying Machinery Co.
Phila. Textile Machinery Co.
Tolhurst Machine Works.

Feed Water Heaters.
Nason Mfg. Co.

Felts.
American Felt Co.

Filters.
Hungerforth & Aerry.

Fire Alarm Systems.
Pettes & Randall Co.

Fire Extinguishers.
Eureka Fire Hose Co.

Fire Hose.
Bailey-Lebby Co.
Eureka Fire Hose Mfg. Co.

Fluted Rolls.
Howard & Bullough.
Metallic Drawing Roll Co.
Schofield & Co., Wm.

Flyers.
Howard & Bullough.
Saco-Lowell Shops.
Thurston & Sons, A. G.
Westcott & Sons, A. A.

Frames.
Steel Heddle Mfg. Co.

Gaskets.
Power Specialty Co.

Gauge Cocks.
Foster Engineering Co.
Nason Mfg. Co.
Powell Co., Wm.

Gear Cutting Machines.
Whiton Mch. Co., The D. E.

Harness—Loom.
Crompton & Knowles Loom Works.
American Supply Co.
Emmons Loom Harness Co.
Garland Mfg. Co.
Knowles & Co., Wm. H.
Scholes, John.

Heating and Ventilating Apparatus.
Phila. Drying Machinery Co.
Phila. Textile Machinery Co.

Heddles.
Crompton & Knowles Loom Works.
Draper Co.
Steel Heddle Mfg. Co.

Heddle Frames.
Crompton & Knowles Loom Works.

Humidifying Apparatus.
American Moistening Co.

Hydro Extractors.
American Tool & Mach. Co.
Schaum & Uhlinger.
Tolhurst Machine Works.

Indicators.
Lippincott, A. C.
James L. Robertson & Son.

Investment Securities.
American Bond & Mortgage Co.
Turner, Tucker & Co.

Jacquards.
Crompton & Knowles Loom Works.
Kilburn, Lincoln & Co.

Kiers.
Butterworth & Sons Co., H. W.

Knit Goods Washers.
Birch Brothers.
Phila. Drying Machinery Co.
Phila. Textile Machinery Co.
Textile Finishing Machinery Co.

Knitting Machinery.
Acme Knitting Machine & Needle Co.
Jenkes Knitting Mach. Co
Taylor, Jas.
Mayo Machine Co., Geo. D.
Nye & Tredick Co.
Scott & Williams.
Stafford & Holt.
Wildman Mfg. Co.

Lamps—Incandescent and Arc.
General Electric Co.
Stuart-Howland Co.
Westinghouse Electric & Mfg Co.

Lappers.
Potter & Johnson Mch. Co.

Laundry Machinery.
American Laundry Mchy. Co.
Bull, Wm. C.
Tolhurst Machine Works.

Linen Yarns.
Hughes Fawcett.

Looms.
Crompton & Knowles Loom Works.
Draper Co.
Kilburn, Lincoln & Co.
Mason Machine Shop.
Stafford & Co.
Stewart & Sons.
Whitin Machine Works.

Lubricants.
Dixon, Jos., Crucible Co.
Graphite Lubricating Co.
Kellogg & Co., E. H.
N. Y. & N. J. Lubricant Co.
Standard Oil Co.

Manila and Sisal Rope.
American Mfg. Co.
Carpenter & Co., Geo. B.

Mercerizers.
Lorimer Sons Co., Wm. H.
Standard Bleachery Co.

Metal Polish.
Hoffman, Geo. W.

Mill Baskets.
Hardy, F. H.
Morris & Co.

Mill Stocks.
Turner, Tucker & Co.

Mules.
Mason Machine Works.

Napper Clothing.
Birch Brothers.

Napping Machines.
Birch Brothers.

Oils—Turkey Red.
Seydel Mfg. Co.

Oil Separators.
American Tool & Mach. Co.
Bailey-Lebby Co.

Openers for Cotton, Wool, Waste, Etc.
Schofield Co., Wm.

Ornamental Iron Work.
Dufur & Co.

Oxidizing Machinery.
Phila. Drying Machinery Co.

Packing, Metallic, Etc.
Bailey-Lebby Co.
Powers Specialty Co.

Paints.
Brown Paint Co., Chas.
Detroit Graphite Co.
Glidden Varnish o.
Standard Paint Co.
U. S. Gutta Percha Paint Co.
Wadsworth, Howland & Co.

Patent Attorney.
Wedderburn, Jr., Alex. J.

Picking Machinery.
Howard & Bullough, Am. Machine Co.
Kitson Machine Shop.
Schofield Co., Wm.

Pickers—Leather.
Garland Mfg. Co.

Picker Sticks.
Garland Mfg. Co.

Pneumatic Conveyors.
Schnitzler, Chas. H.

Power Companies.
Columbus Power Co.

Press Papers.
Phila. Drying Machinery Co.

Presses.
Butterworth & Sons Co., H. W.
Hydraulic Press Mfg. Co.
Logemann Bros. Co.
Phila. Drying Machinery Co.
Reliance Machine Works.
Textile Finishing Machinery Co., The
U. S. Hoffman Co.
Woonsocket Machine & Press Co.

Pulleys.
Oneida Steel Pulley Co.

Pumps.
The Deming Co.
Leiman Bros.
Morris Machine Works.
Phila. Drying Machinery Co.
Textile Finishing Machinery Co., The.
Toomey, Frank.
Walsh & Weidner Boiler Co.
Seydell Mfg. Co.

Railings.
Dufur & Co.

Reeds.
American Supply Co.
Emmons Loom Harness Co.
Garland Mfg. Co.
Scholes, John.
Stewart &Sons.

Reels.
Crompton & Knowles Loom Works.
Draper Co.
Easton & Burnham Mch. Co.
Lindsay, Hyde & Co.
Saco-Lowell Shops.
Schofield Co., Wm.

Reflectors.
Nelite Wks. of Gen. Electric Co.

Rib Top Cutters.
Wildman Mfg. Co.

Ring Travelers--Steel and Bronze.
Dary Ring Traveler Co.
DeHaven Mfg. Co.
Whitinsville Spinning Ring Co.

Roller Bearings.
Hyatt Roller Bearing Co.

Roofing.
Bailey-Lebby Co.
Barrett Mfg. Co.
Brown Paint Co., Chas. H.
Cortright Metal Roofing Co.
Johnston Paint Co., The R. F.
Lincoln Waterproofing Cloth Co.
Standard Paint Co.

Rope.
American Mfg. Co.
Bailey-Lebby Co.
Carpenter & Co., Geo. B.

Roving Machinery.
Howard & Bullough.
Saco-Lowell Shops.
Woonsocket Mach. & Press Co.

Saddles and Stirrups.
Dixon Lub. Saddle Co.

Second Hand Machinery.
Toomey, Frank.

Sewage Disposal.
Cameron Septic Tank Co.

Sewing Machines.
Birch Bros.
Marrow Machine Co., The

Shaft Aligning Apparatus.
Hess Bright Mfg. Co.

Sheeting.
Barrell Co., Wm. L.

Shuttles.
Crompton & Knowles Loom Works.
Draper Co.
Shambow Shuttle Co.

Singeing Machinery.
Birch Brothers.
Butterworth & Sons Co., H. W.
Hussa, Teo. F.
Phila. Drying Machinery Co.
Textile Machinery Finishing Co., The.

Size Kettles.
Howard & Bullough, American Machine Co.
Textile Machinery Finishing Co., The.

Sizing and Finishing Compounds.
Arabol Mfg. Co.
Arnold-Hoffman & Co.
Bosson & Lane.
Metz & Co., H. A.
Modoc Co., The.
Seydel Mfg. Co.

Slashers.
Butterworth & Sons Co., H. W.
Globe Mach. & Fdry. Co.
Howard & Bullough, American Machine Co.
Textile Finishing Machinery Co., The.

Slubbers.
Howard & Bullough, American Machine Co.
Saco-Lowell Shops.

Soaps.
Am. Soap & Washoline Co.
Modoc Company.
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Classified Index to Advertisers—Continued.

Softeners—Cotton.
Arabol Mfg. Co.
Modoc Company.
Penna. Oil, Soap & Chem. Co.
Seydel Mfg. Co.
Tanner Co., Chas. R.
Zurn Co., The O. F.

Spindles.
Draper Company.
Easton & Burnham Mch. Co.
Westcott & Son, A. A.

Spinning Machinery.
Draper Company.
Fales & Jenks Mch. Co.
Howard & Bullough, American Machine Co.
Mason Machine Co.
Saco-Pettee Co.
Whitin Machine Works.

Spinning Rings.
Draper Company.
Howard & Bullough.
Whitinsville Spinning Ring Co.
Whitin Machine Works.

Spooling Machinery.
Draper Company.
Easton & Burnham Mach. Co.
Lindsay, Hyde & Co.
Saco-Pettee Co.
Whitin Machine Works.

Spools—Metal.
Lestershire Spool & Mfg. Co.

Storage.
P. J. Riley & Co.

Steam Specialties.
Bailey-Lebby Co.
Foster Engineering Co.
Nason Mfg. Co.
Powell Co., Wm.
Power Specialty Co.

Steam Traps.
Bailey-Lebby Co.
Nason Mfg. Co.

Steam Turbines.
Allis-Chalmers Co.
General Electric Co.
Westinghouse Machine Co.

Stencils.
Atlanta Stamp & Stencil Wks.
Bradley Mfg. Co., A. J.

Stop Motion.
Wildman Mfg. Co.
Crompton & Knowles Loom Works.
Draper Company.
Globe Machine & Fdry. Co.

Superheaters.
Power Specialty Co.

Tanks and Tubs.
Bowser & Co., S. F.
Dixie Culvert & Metal Co.
Lombard Iron Works & Supply Co.
Phila. Drying Machinery Co.
Textile Finishing Machinery Co., The.
Walsh & Wiedner Boiler Co.

Tapes and Braids.
Weinar Brothers.

Telephone System s.
Pettes & Randall Co.

Temples.
Draper Company.

Tenters.
Butterworth & Sons Co., The.
Textile Finishing Mach. Co.

Thin Place Peventers.
Draper Company.
Clayton & Bentley Co.

Thread Guides.
Palmer Co., The I. E.

Trade Mark Lawyers.
Duvall, Jr., Edward.

Transmission Rope.
American Mfg. Co.
Carpenter & Co., Geo. B.

Travelers.
Dary Ring Traveler Co.
Whitinsville Spinning Ring Co.

Trucks.
Clark Co., The Geo. P.

Twine Machinery.

Twisting Machinery.
Draper Company.
Fales & Jenks Mch. Co.
Haskell-Dawes Mch. Co.
Howard & Bullough, American Machine Co.
Leigh & Butler.
Saco-Lowell Shops.
Whitin Machine Works.

Valves—Steam, Ammonia, Water, Etc.
Bailey-Lebby Co.
Foster Engineering Co.
Nason Mfg. Co.
Powell Co., Wm.
Power Specialty Co.
Toomey, Frank.

Ventilating Fans.
Seymour, J. M.
Clarage Fdry. & Mch. Co.

Warp Tying Machines.
Barber-Coleman Co.

Warpers and Warping Machinery.
Crompton & Knowles Loom Works.
Draper Company.
Entwhistle & Co., T. C.
Howard & Bullough, American Machine Co.
Saco-Lowell Shops.

Waste.
Massasoit Mfg. Co.
Robert Bishop Mfg. Co.

Waste Machinery.
Howard &Bullough.
Leigh & Butler.
Saco-Lowell Shops.
Sargent's Sons Co., C. G.
Schofield Co., Wm.

Waste Washing Machine.
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Barrell Co., Wm. L.

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Birch Brothers.
Textile Finishing Machinery Co., The.

Water Softeners.
Hungerford & Terry.
Scaife & Sons Co., Wm. B.

Winding Machinery.
Foster Machine Co.
Howard & Bullough, American Machine Co.
Lindsay, Hyde & Co.
Taylor, Jas.

Wood Preservatives.
Carbolineum Wood Pre. Co.
The Northeastern Co.

Wood Working Machinery.
Smith Machine Co., H. B.

Woolen Machinery.
Birch Brothers.
Crompton & Knowles Loom Works.
Draper Company.
Leigh & Butler.
Lindsay, Hyde & Co.
Phila. Drying Machinery Co.
Phila. Textile Machinery Co.
Sargent's Sons Co., C. G.
Schofield Co., Wm.
Textile Finishing Machinery Co., The.
Lindsay, Hyde & Co.

Yarns.
Arlington Mills.
Cannon Mills.
Hughes Fawcett.
Lorimer's Sons Co., Wm. H.
Philadephia Yarn Co.
Riley Co., C. E.
Tolar & Hart.
Whitman & Co., Wm .

Yarns—Linen.
Hughes Fawcett.

Yarns—Turkey Red.
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Messrs. Baldwin & Leslie will discontinue selling for us plain print cloth constructions and other standard convertibles, and will sell only the various dobby and fancy effects in the grey as produced by our various plants.

Messrs. J. P. Stevens & Co. will continue to sell the product of the Seneca plant, which is on standard print cloths.

Messrs. Grinnell Willis & Co. will continue to sell the products of the Walhalla and Wallace plants, namely: sheeting for the jobbing trade and for export.

Messrs. Clarence Whitman & Co. will continue to sell such portion of our products as we finish and sell converted.

Mr. R. K. MacLea will continue to represent us as Special Representative at his office, Room 1038, New York Life Insurance Building, and can be consulted with regard to special constructions and characters of goods.

The above distributors will sell the entire product of the following plants:

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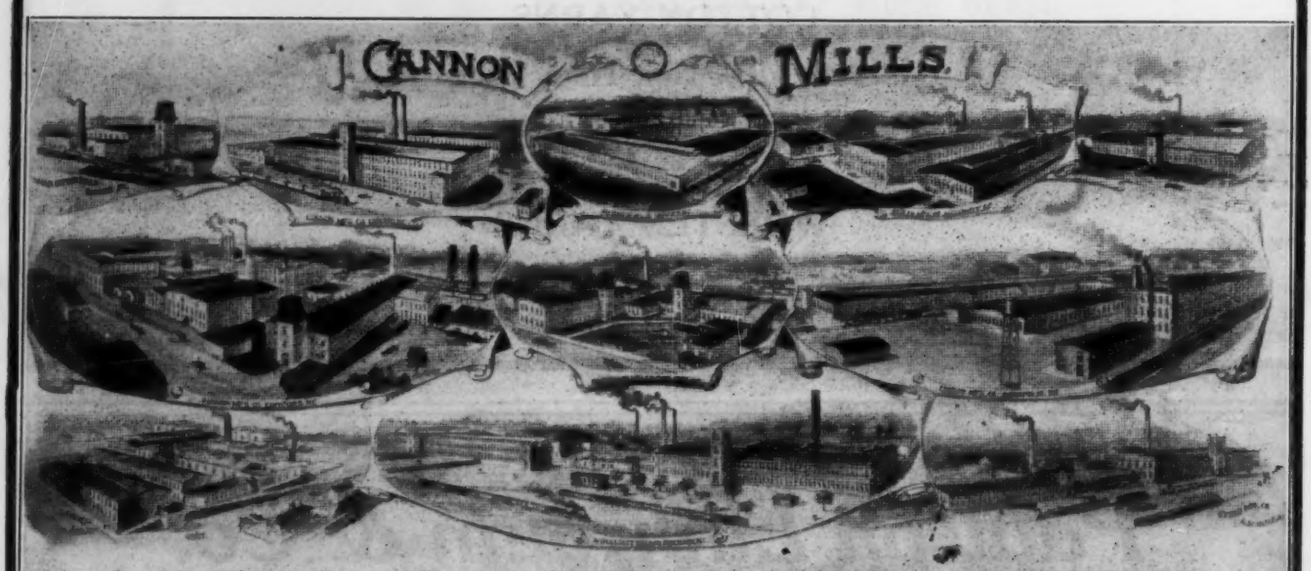

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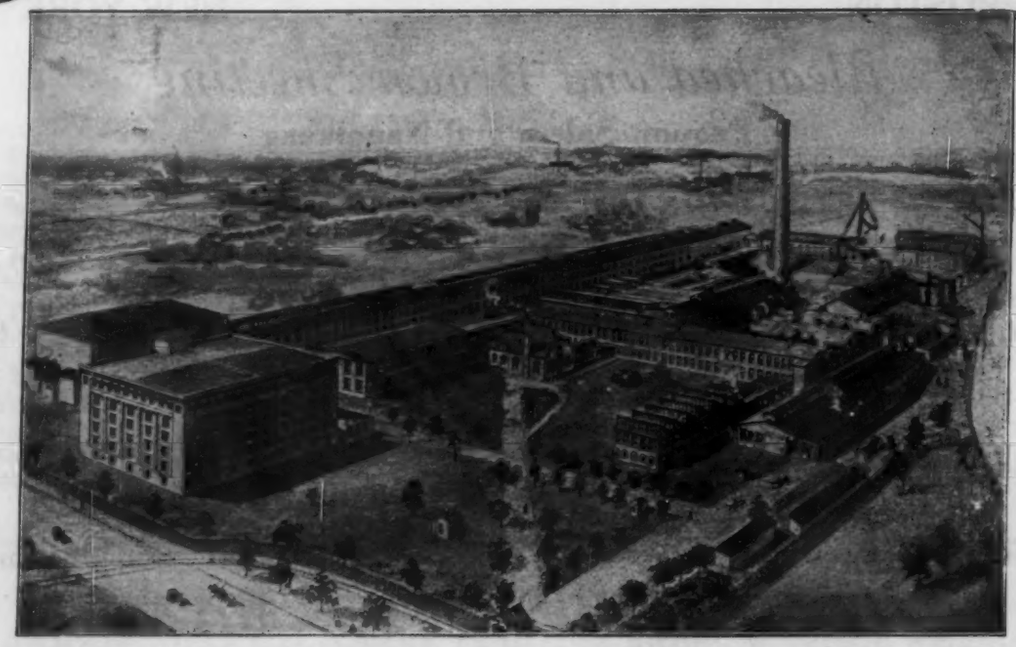

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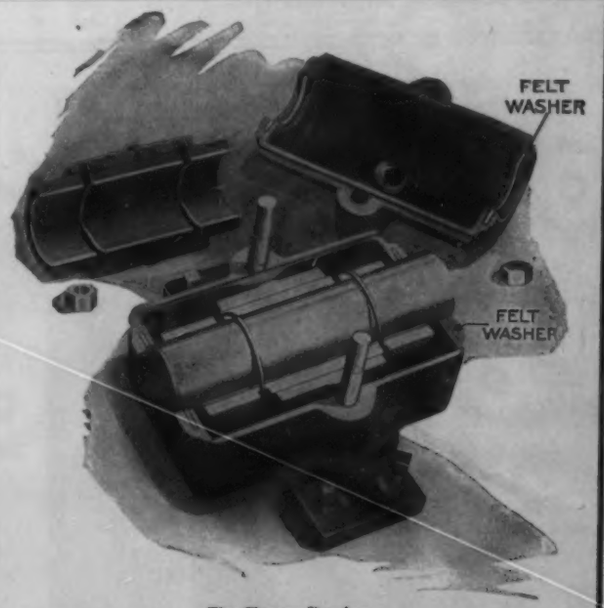

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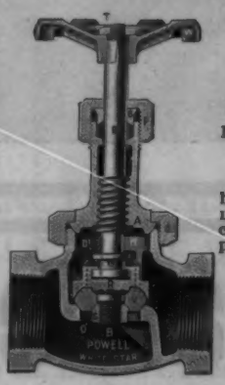

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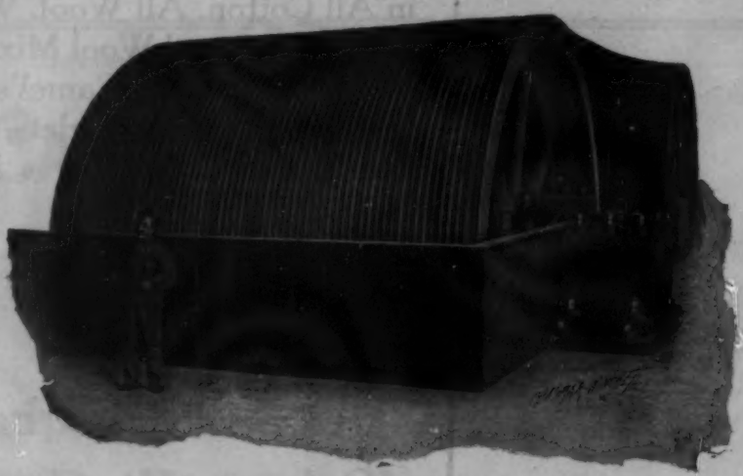

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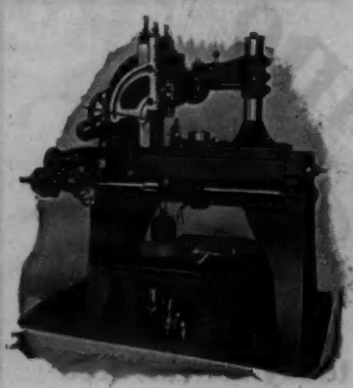

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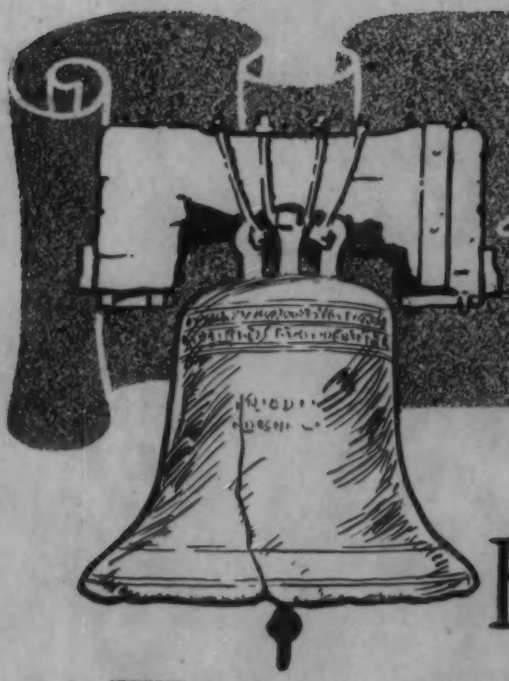

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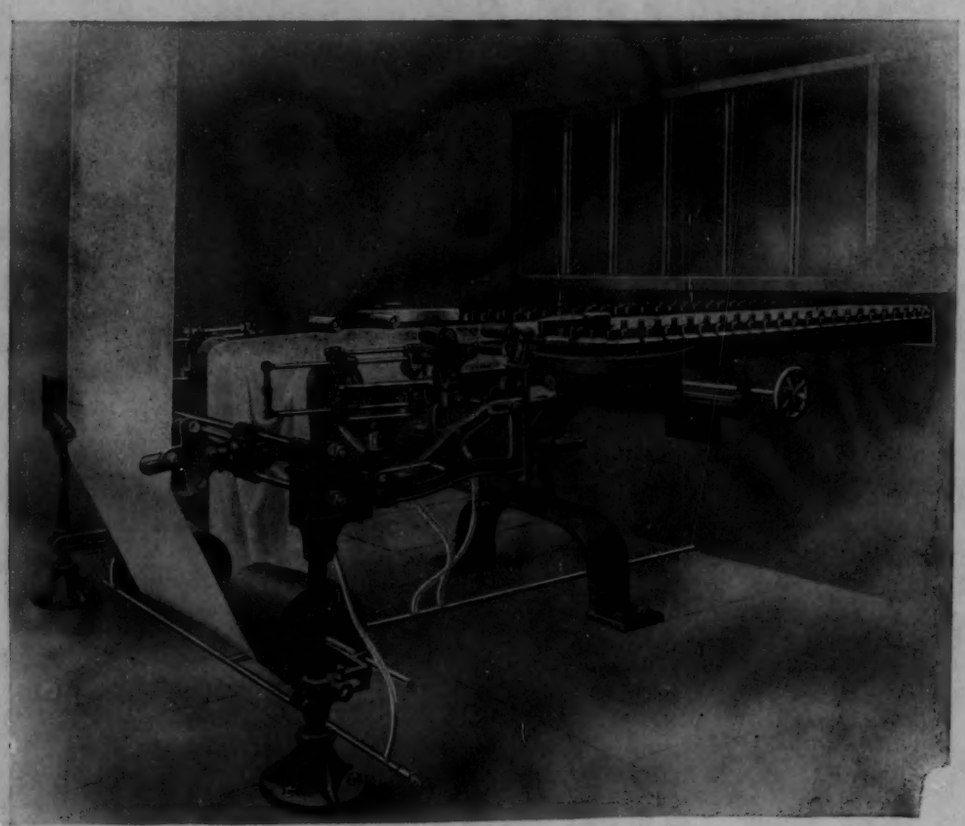

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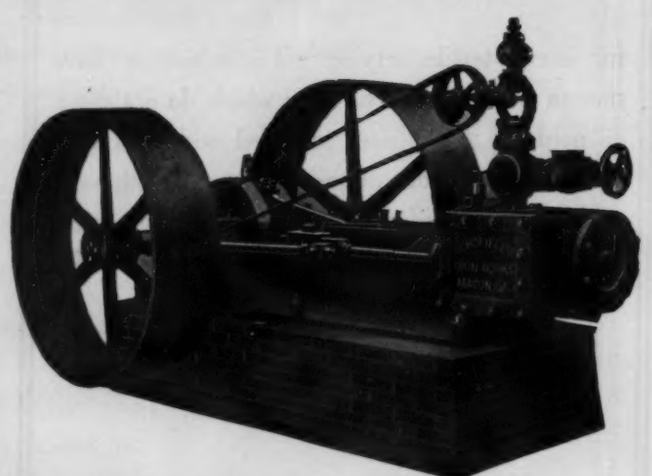

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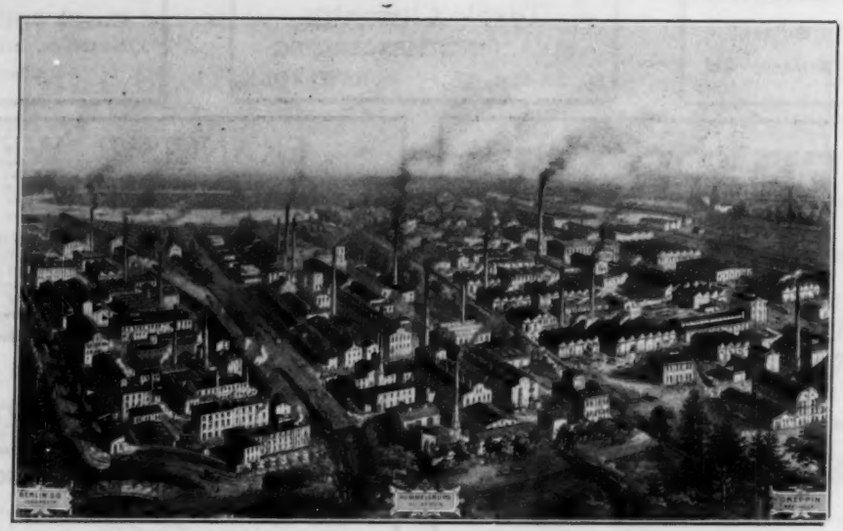

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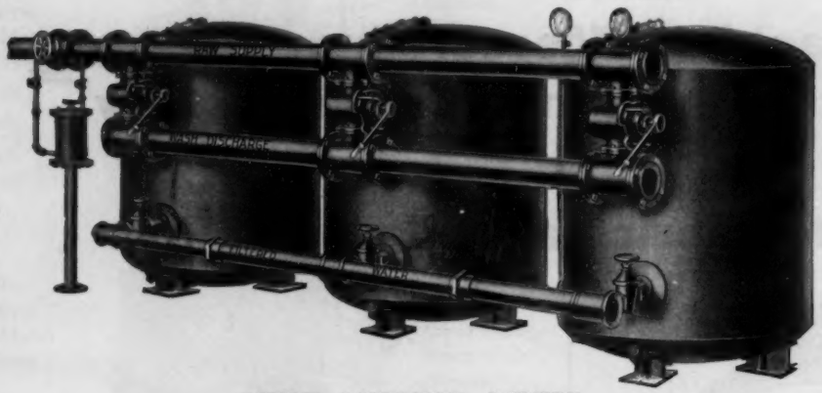

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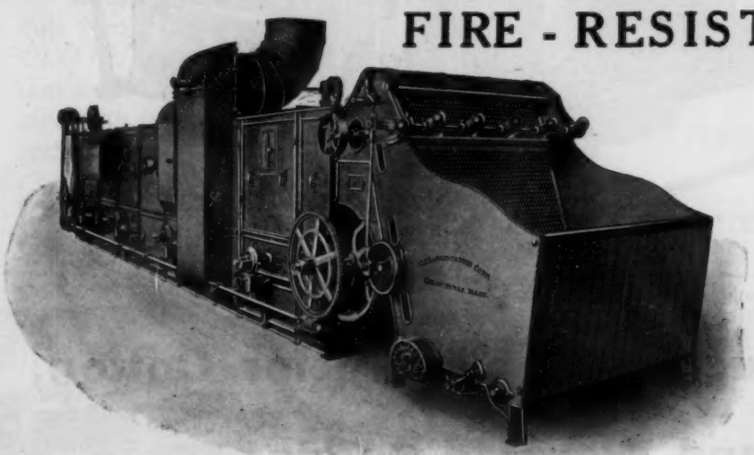

The Standard dryer for modern cotton mill equipment. Ball bearing fans.

Cast-iron and Steel Construction, with heavy asbestos insulation. No wood.

Automatic Opening Feeders for soft waste, and for loose cotton in all conditions. Yarn Conditioning Machines. Cotton Waste Willows.

Wool Washers, Wool Dusters, Carbonizing Plants, Burr Pickers.

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The Textile-Finishing Machinery Co.

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Singeing, Bleaching, Mercerizing, Dyeing, Drying, Printing and Finishing Machinery

FOR

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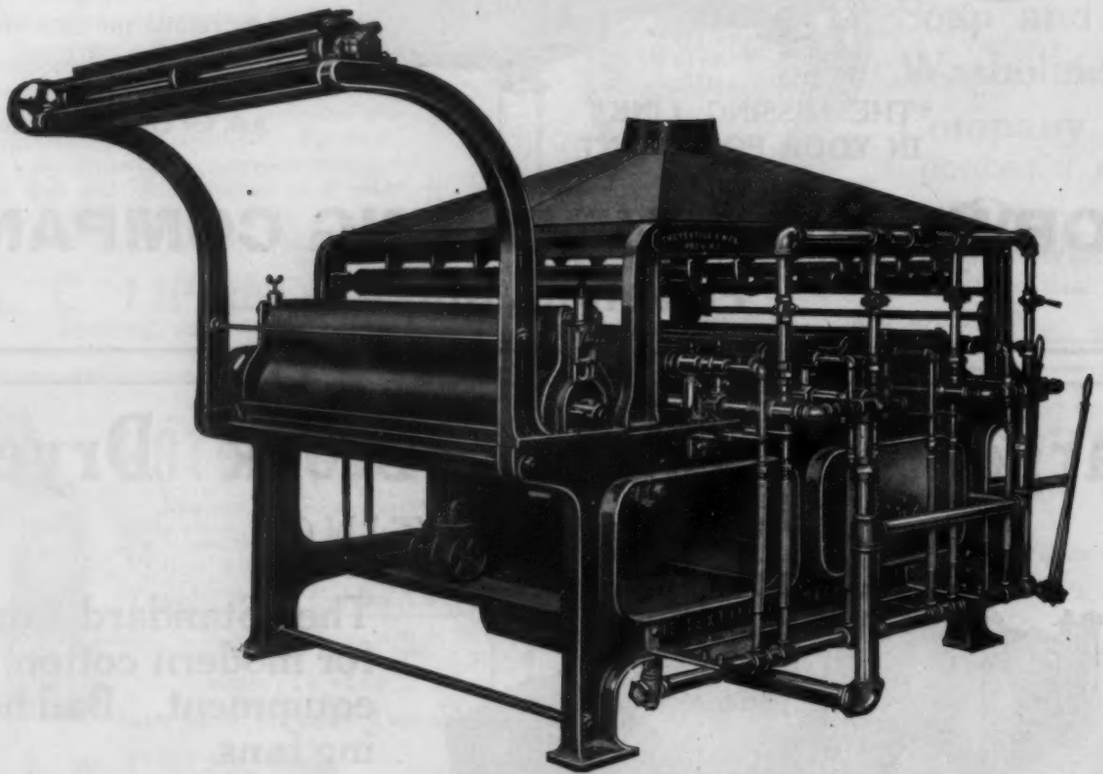

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2, 3, 4, 5 and 6 burner GAS SINGERS for Cotton, Woolen and Worsted Goods.

Also Plate Singers of all kinds.

Pressure and Open KIERS for Woven and Knit Goods, Yarns and Raw Stock.

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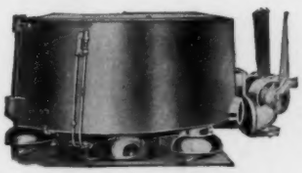

Also Direct Connected Electrically Driven

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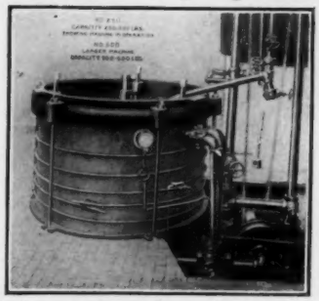
Economical Cotton Dyeing and Bleaching

In the Psarski Dyeing Machine

Saves Labor
Saves Dyes
Saves Drugs
Saves Steam
Saves Water



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Sulphur—Developed—Vat Dyes
Done Equally Well

RAW STOCK DYEING—The cotton goes to cards in as good condition as directly from bales. Is not rolled into balls and strings.

BLEACHING—Bleached and washed PERFECTLY CLEAN—FREE FROM CHLORIN OR ACID. 3½ hours to batch. Is not pounded and twisted into practically waste.

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HOSIERY—Recommended size of machine does 300 pounds to batch. SULPHUR OR DEVELOPED BLACKS. It is not Roughed—No Singeing required—No Sorting—No Damaged.

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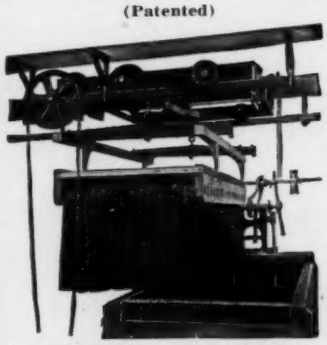

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Labor cost reduced 75%.
Steam cost cut in two.
Winding increased.
Waste eliminated.
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Sampling is easy.
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First cost low.
Repairs nominally nothing.
Terms to suit you.

Still dyeing is the logical, the accepted way
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The model 12 cone winder has many patented features that reduce winding cost and perfectly finish the spinner's product. It is, however, the simplest quick traverse machine ever built and has actually fewer parts than before the metallic tension and slub catcher, increasing taper cone or differential motion were incorporated in it.

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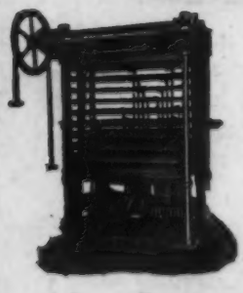

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FOR COTTON, WOOL, RAGS, HAIR, Etc.

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COTTON

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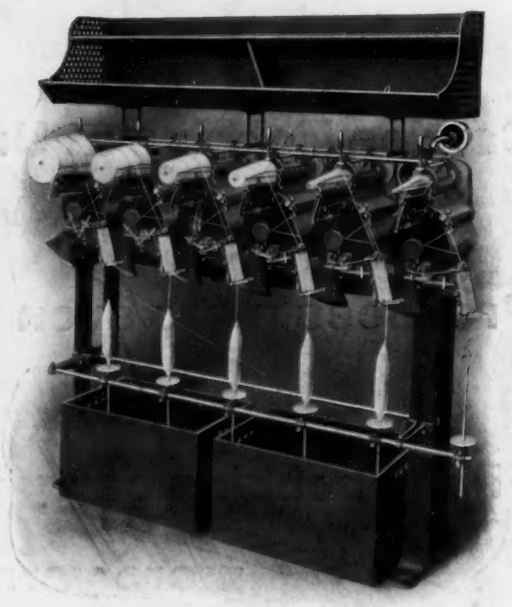

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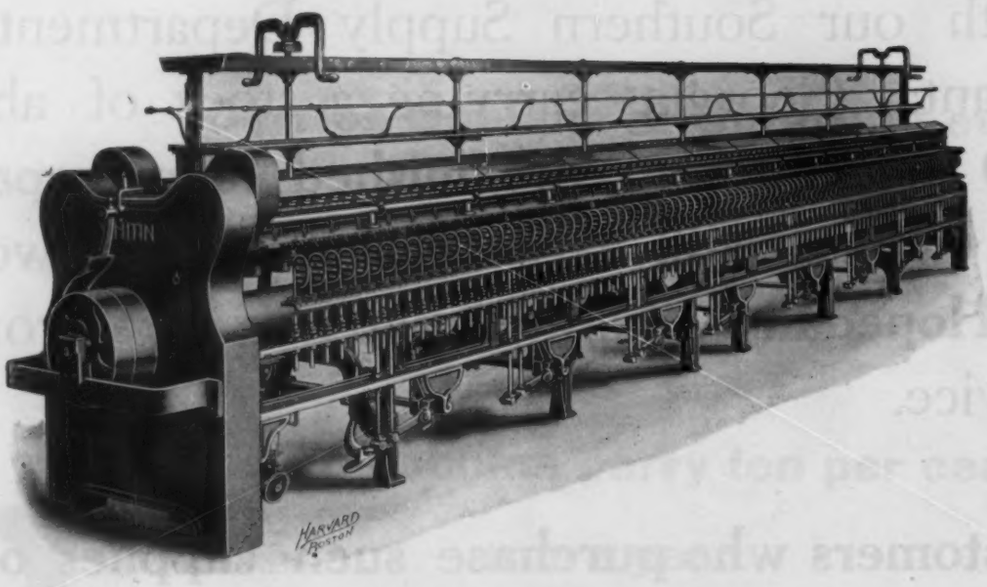

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Over the leather system before placing orders for new machinery, or if contemplating an increase in production, have them applied to their old machinery.

25 TO 33 PER CENT. MORE PRODUCTION GUARANTEED

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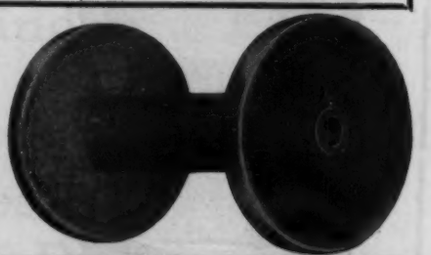

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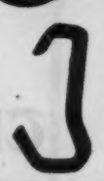

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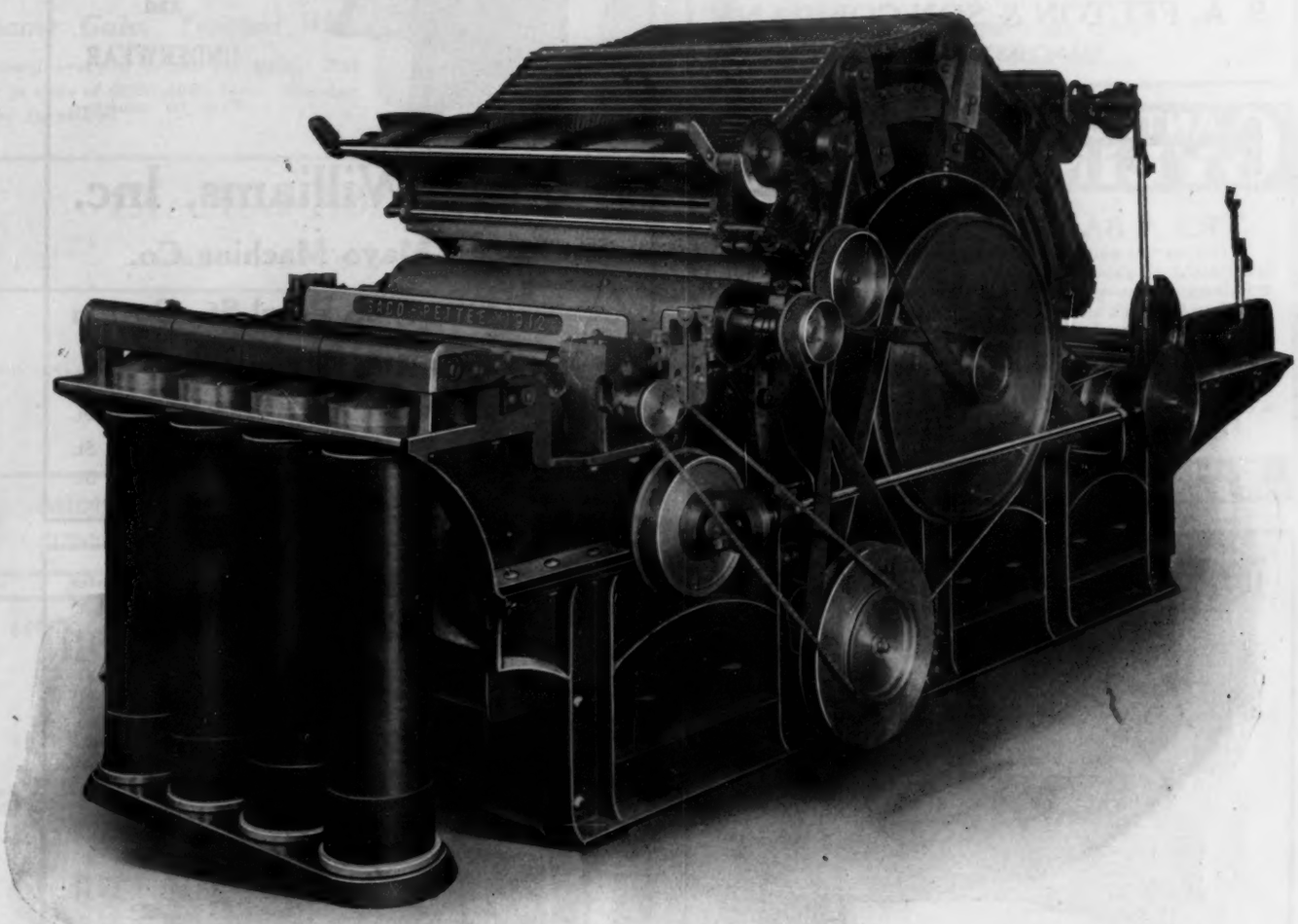

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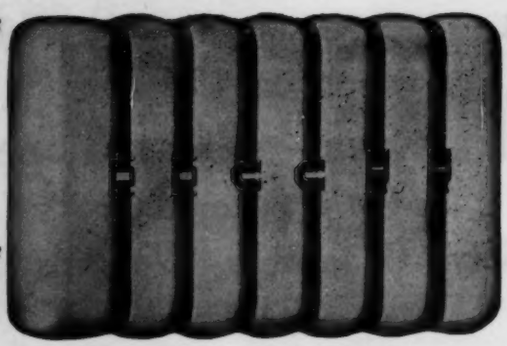

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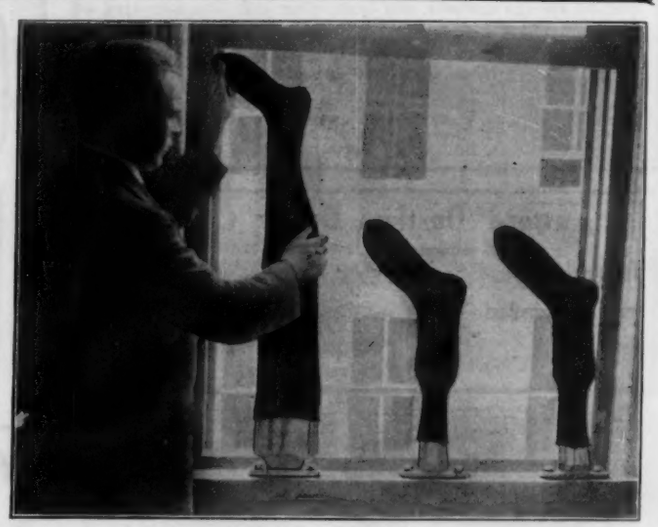

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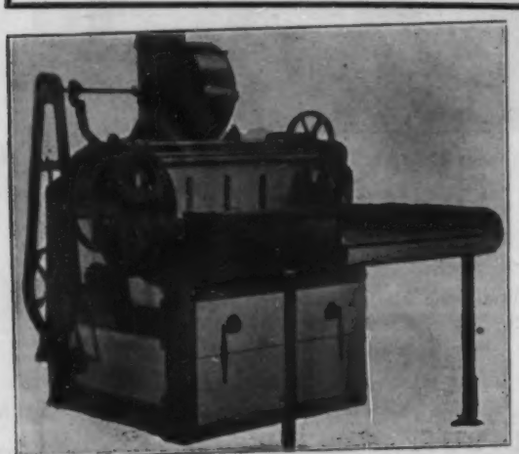

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"Schofield" intermediate feeds for Cards, Wool, Rag, Waste, Hair and Lumper Pickers, Automatic, Cone and Oldham Willows, Rag and Extract Dusters, Waste Pullers, Blamaine Lap Feeds, Curled Hair Pickers, etc.

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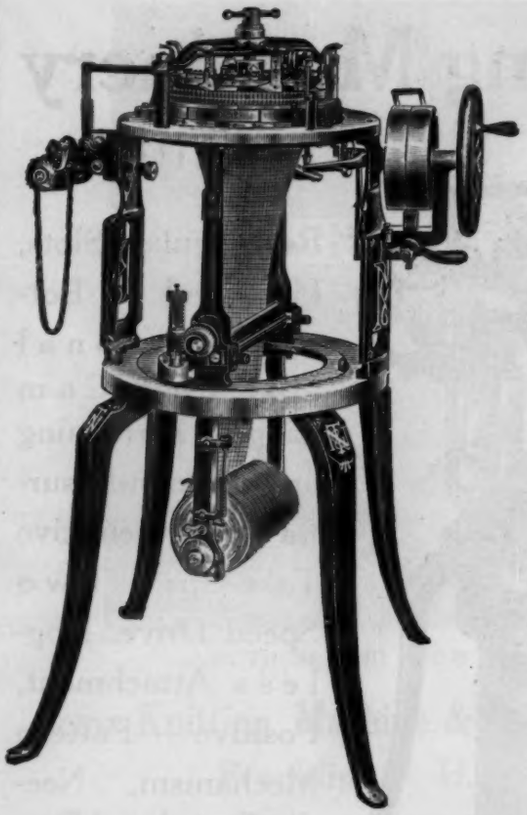
Iron Founders, Textile Machinery Builders,

Krams Ave., Manayunk, Philadelphia, Pa.



NYE & TREDICK CO.

MANUFACTURERS OF

Circular Rib

Knitting Machinery

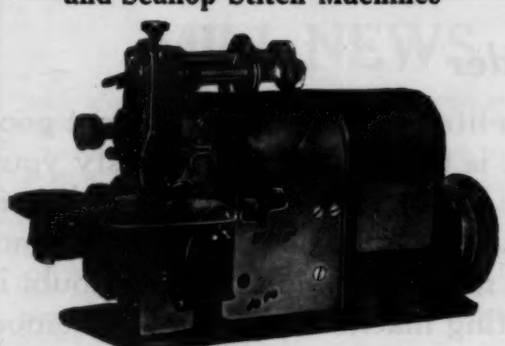
FOR

Underwear and Hosiery

Office and Show Rooms
718-720 Cherry St.,
PHILADELPHIA, PA.

THE MERROW

High Speed Overseaming, Overedging and Scallop Stitch Machines



Our New Style 60 Machine

For Trimming and Overseaming in one operation produces the strongest seam with the greatest economy.

USE STYLE 60S for welting Stockings, blind stitch.
USE STYLE 60H for hemming bottoms of Underwear.
USE STYLE 17 or 22 for Bed Blankets.
STYLE 18 is for Horse Blankets.

SEND FOR SAMPLES AND CATALOGUE

THE MERROW MACHINE CO.

28 Laurel Street, HARTFORD, CONN.

427 Broadway, New York, 237 Market St., Chicago
Knickerbocker Bld'g, 6th and Arch Sts., Philadelphia, Pa.

Here It Is

The most popular extra heavy swivel caster on the market, and is doubly so when provided with our No. 80 Roller Bearings.

Sales constantly increasing.
Write for catalog.

THE GEORGE P. CLARK CO.

"Pioneer Truck and Caster Manufacturers"
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New York Office 13-21 Park Row

The American Audit Co.

F. W. LAFRENTZ, C. P. A., Pres. — Telephone Main 872
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Specialists in Cost Systems and Manufacturing Accounts.

C. B. BIDWELL, C. P. A., Resident Vice-President.

Circular Rib Knitting Machinery

PRODUCTS

Underwear, Sweaters, Cuffs with Cut Welt, Selvage, or French Welt, Mantles, Collarettes, Toques, Golf Caps, Hosiery Tops, Skirts, Borders, Corset Covers, Button Stays, Mittens, Bandages.

FEATURES

Rectangular Slots, Hardened at Bottom, Sectional Caps and Cam Rings, Hardening and Ground surfaces, Sensitive Take-Ups, Two Speed Drive, Dogless Attachment, Positive Pattern Mechanism, Needle Guard and Protector, Automatic Stop Motions, Electric Cloth Cutters.

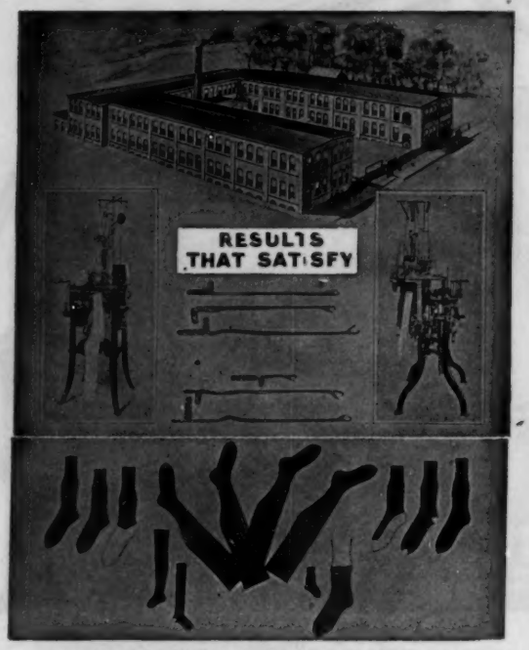
Stock Holder

One of the most important requisites in life is to learn where to get good value for your money. This advertisement is to enable you to satisfy yourself where you can get that value in circular latch needle knitting machinery and accessories—machinery which pays the best returns when its efficiency as well as its first cost is considered. We make that kind. If you doubt it, won't you write to us when in need of knitting machinery and let us demonstrate what advantages our make has for you?

Wildman Mfg. Co.

Established 1889 **NORRISTOWN, PENN.**

Quality of Product Secures for Our Customers



ASK THOSE WHO KNOW

Acme Knitting Machine & Needle Co.

Franklin, N. H.

Bourse Bldg., Philadelphia, Pa.

STAFFORD & HOLT

Builders of CIRCULAR

Rib Knitting Machinery

For Knitting the Latest Style Fabrics.

FOR

Underwear, Sweaters Toques, Cardigan Jackets, Borders, Etc.

Also Builders of

Napping Machines

The Stafford and Holt Pineapple Stitch Machine is the Latest

Write for Descriptive Circular

Little Falls, New York

IF YOU WANT HELP

IN ANY DEPARTMENT OF YOUR MILL, IT IS LIKELY YOU CAN GET IT THROUGH

An Ad in the

MILL NEWS

which is read by more mill people than any other paper in the South. Write for sample copy and advertising rates.

Besides this we often bring the employer and employee together by means of the

Mill News Employment Bureau

which is entirely distinct from the newspaper advertising and is especially intended for Superintendents, Overseers and men in the higher positions, who are already employed but can safely use this confidential means of securing better positions.

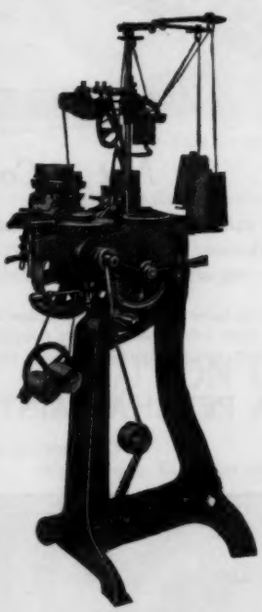
If you will kindly inform us, as far as possible in advance, just what kind of man you want, stating amount of wages, etc., we shall take pleasure in helping you; and it will be our rule not to recommend any man for a position unless we have a personal knowledge or positive assurance of his fitness for the same.

We shall appreciate any communication from you along this line and feel safe in saying that we are in better position than any one else to render you such service.

Yours very respectfully,

Mill News Printing Company,

CHARLOTTE, N. C.



Quality AND Economy

INVINCIBLE

JENCKES KNITTING MACHINE COMPANY

PAWTUCKET, :: :: RHODE ISLAND

Philadelphia Show Rooms, 1211-1217 Filbert Street

DON'T apply an inferior white whose dry, flat, lustreless surface will soon require renewal because of scaling and flaking. Such whites, however cheap at the start, are very costly in the long run; moreover, their porous body makes them a "catch-all" for factory dust and germs.

RICE'S MILL WHITE

"The Paint that Brims Over With Sunlight"

Not a Cold-water Paint

is the paint of true economy. Its firm yet elastic surface will neither flake nor scale. Ordinary conditions have no yellowing effect upon it. It makes an easily cleanable wall finish, is non-poisonous, therefore perfectly sanitary. It flows freely under the brush in less time than gloss whites which "drag."

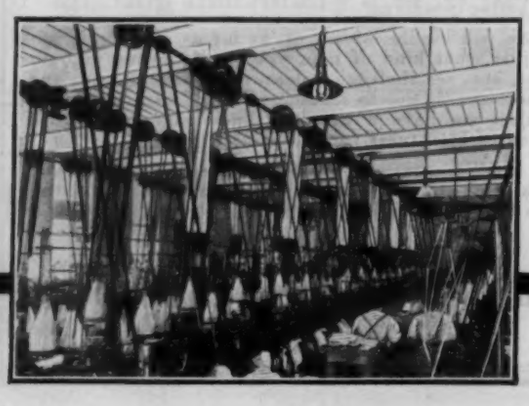
If you have 20,000 or more square feet of ceiling and wall space to cover, write us on your letter head for a free sample board showing its fine surface and high reflective power, and our booklet, "Make the Most of Daylight in Your Plant." Address

U. S. GUTTA PERCHA PAINT CO., 22 Dudley St., Providence, R. I.

Originators of the Mill White Idea

Interior of Hosiery Mill before using.

Interior of Hosiery Mill after using.



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Knuckle Joint
Baling
Press
IN SIZES
50 to
500 TONS
Send for Catalog

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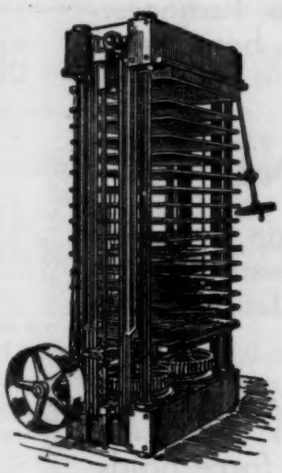
A. H. WASHBURN, Charlotte, N. C., Southern Agent



RELIANCE
Hot Plate Screw Press
FOR
Hosiery and Underwear
Write for Catalog and Prices
CHARLES HART,
Reliance Machine Works,
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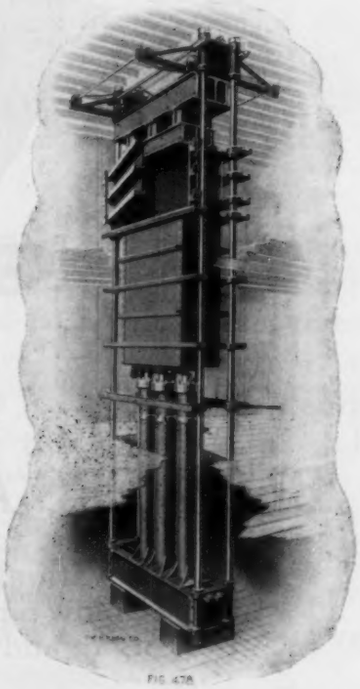
"For Your Pressing Needs"
Save the By-Products
by baling with a
Hydraulic Press



200 Ton Steel Box Baling Press.

The illustration shows a steel box baling press for baling waste paper, cotton waste, and loose material of various kinds. Note the size and general makeup of this press.

Our
COTTON COMPRESSES
have no superiors.

We have a big line of standard lard and grease, oil, and baling presses, and are fitted for making any kind of a special press you may desire.

Let us send you full particulars.

The Hydraulic Press Mfg. Co.

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BLOWERS AND VACUUM PUMPS

For use with all gas and oil appliances, furnaces, forges, blow pipes, gas producer plants, boat whistles, organ and calliope blowing and

VACUUM CLEANING

A powerful, noiseless machine, made in eight sizes, for any work requiring air at pressures from one ounce to ten pounds or a vacuum from one to twenty inches.

These are the only machines that take up their own wear; small piston gives big air space; no springs or delicate parts; centrifugal force holds wings against cylinder; noiseless; slow speeds.

SENT ON TRIAL

Get Catalog No. 237 for Blowers or No. 238 for Vacuum Pumps

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EUREKA FIRE HOSE

Was Awarded GRAND PRIZE at the St. Louis Exposition 1904 for Superior Quality of Goods

HOSE FOR ALL PURPOSES.

Including the Celebrated Brands

EUREKA	PARAGON	RED CROSS
Four Ply	Three Ply	Two Ply

The only circular and seamless woven brands of fire hose that possess four,—three and two entirely distinct and independent plies, and can be entirely separated, and possess four,—three and two warp and filling threads.

FOR FACTORY AND MILL PROTECTION

These goods are especially adapted for use in Cotton, Oil, Woolen, Silk Print, Knit Goods and Carpet Mill, Pulp and Paper Mills, Sugar Refineries, Ice and Refrigerating Machinery, Chemical Works, Tanneries, Etc.

Samples and Full Information given on Application.

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AGENCIES: Charlotte, Greensboro, N. C., Atlanta, Ga., New Orleans, La., and Memphis.

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ELECTRIC SINGEING MACHINERY

FOR COTTON, WORSTED, SILK AND SCHAPPE YARNS AND WIDEGOODS

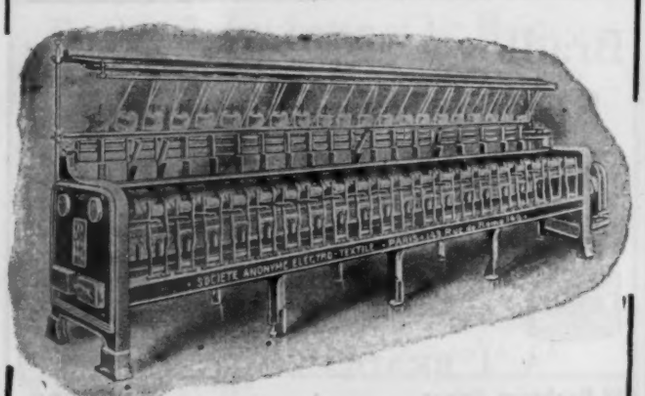
Economy, Quality, Hygiene

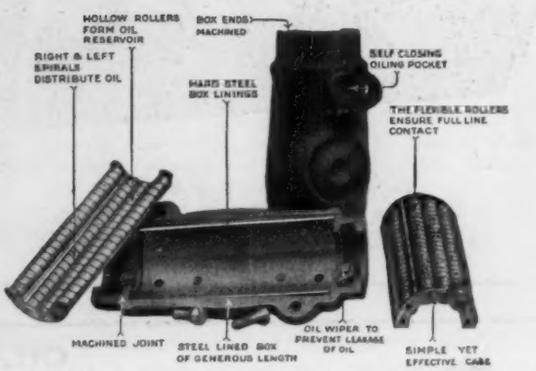
We lower your cost of production from 30 to 60 per cent.
We produce yarns of finer quality.
We produce yarns of better color.
We give you absolutely clean yarns and CLEAN SAFE WORK-ROOMS.
Simple to operate.

The only machine that allows manufacturers to meet the demands of increasingly rigid legislation controlling the health conditions of the work-room.

SOCIETE ANONYME ELECTRO-TEXTILE
SOLE AMERICAN REPRESENTATIVE

THEO. F. HUSSA, 136 Liberty St., **New York**




HOLLOW ROLLERS FORM OIL RESERVOIR
BOX ENDS MACHINED
RIGHT & LEFT SPIRALS DISTRIBUTE OIL
SELF CLOSING OILING POCKET
HARD STEEL BOX LININGS
THE FLEXIBLE ROLLERS ENSURE FULL LINE CONTACT
MACHINED JOINT
STEEL LINED BOX OF GENEROUS LENGTH
OIL WIPER TO PREVENT LEAKAGE OF OIL
SIMPLE YET EFFECTIVE CAGE

A certain manufacturer wrote us some time ago and asked if it would be possible to save enough power by the adoption of the Hyatt Flexible Roller Bearing to make the purchase of a larger engine unnecessary.

We sent an engineer who looked over the plant, and on the report submitted we made our recommendations.

That manufacturer is more than satisfied today because he is getting power that before was wasted in overcoming friction.

How about your plant?

The Hyatt Flexible Roller Bearing will save from 50 to 70 per cent of the friction load. Power that is now wasted in friction will be available for productive work.

HYATT ROLLER BEARING CO.
NEWARK, NEW JERSEY

2046-B

The Felton "One-a-Year" Floor Scrub.

Made to last. A heavy block, filled with a tough, long-wearing fiber. Two handle holes make brush reversible.

Let Us Figure on Your Brushes.

"Southern Made Mill Brushes Made Right."

D. D. FELTON BRUSH COMPANY
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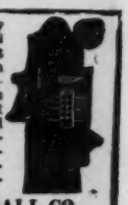
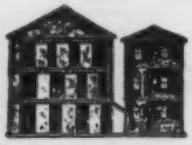
Wire Railings for Cemeteries, Lawns, Gardens and Balconies, Office and Bank Grilles, Counter Railings, Elevator Enclosures and Cabs, Window Guards, Tree Guards, Sand and Coal Screens, Wire Cloth, Sieves, Fenders, Wire Chairs, Settees, etc.

You can save enough INSURANCE to pay for our Cleveland Magneto AMERICAN WATCHMAN'S CLOCK in a short time. It costs nothing for repairs. We also furnish FIRE ALARM SYSTEMS installed complete. Our TELEPHONE SYSTEM is automatic and connects each department without a central operator; we install and sell outright. Our ELECTRIC TIME SYSTEM, with Master Clock in office and Secondary Clocks throughout mill, gives Uniform time in all departments. Our Employees' Clock is the best on the market.



SEND FOR CATALOGUE "C". PETTES & RANDALL CO.
150 Nassau Street, NEW YORK CITY.



CHARLES H. SCHNITZLER

Patentee and Sole Manufacturer of

THE PNEUMATIC CONVEYOR

For the handling of wool and cotton stock, rags, excelsior, jute and all kinds of fibrous material, wet or dry. Also spool elevators, steam heating and ventilating and mill work generally. Blower and fan work a specialty.
This conveyor is patented. Beware of infringement.

Satisfaction Guaranteed

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DIXON LUBRICATING SADDLE CO., BRISTOL, R. I.

SOLE MANUFACTURER OF

Dixon Patent Locking and Stirrup Adjusting Saddles and Stirrups

The weight can be taken off and put on to the middle rolls, without stopping your frames, when long stapled cotton is used. The stirrup is always in place. No bent stirrup resting on rolls. Manufacturers of all kinds of saddles, stirrups and levers. Send for samples and prices. Spinners' Supplies in General.

The "Lawrence" Mill Crayon

is clean, gritless, economical, and perfectly safe.
Improved formula and process.

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THE QUALITY OF YOUR ILLUSTRATIONS

IS A CRITERION OF THE STANDARD OF YOUR PRODUCT

Our PRINTWELL PLATES will give Them the Right Impression

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Intelligently Designed, Carefully Built and Thoroughly Tested. Long Service, Low Cost of Maintenance and High Efficiency are the Standards of our Apparatus.

Write for our pamphlet B on C-W Electrical Machinery

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AMPERE, N. J. Offices in all Principal Cities.

Manufacturers and Repairers of

Textile Mill **BRUSHES** of Every Description

Let us Estimate. We can save you money

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The Unquestionable References of MILL-LIGHT

Insure you against loss. Its labor, light and money saving properties make it a constant source of profit. It is a paint without the destructive faults of other kinds.

Write for detailed information.

The Charles H. Brown Paint Co.,
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Bradley Stencil Machine

Bradley Ball Stencil Pot uses Liquid Ink for marking and stenciling. Price 30c or $3.00 per doz. Manufacturers of Oil Stencil Papers.

Write for Prices and Samples.

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99 Beekman Street, NEW YORK.

Necessaries for the Mil and Shipping Department

CARY'S EVERLASTING FLEXIBLE STEEL MAT

Has a Scraping Surface in Every Direction.
Practically Indestructible.

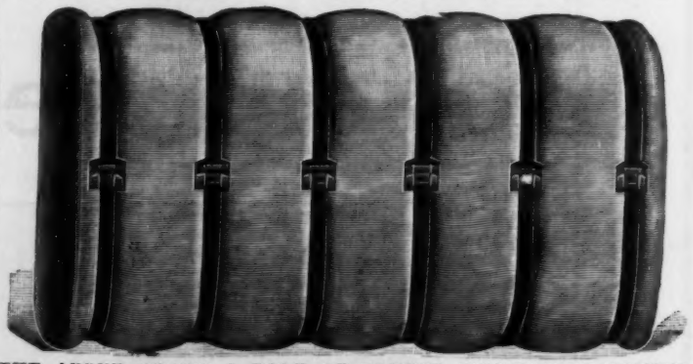
Rust-Proof
Reinforced Edges
Sanitary
Self-cleaning

The U. S. Government has contracted for this Mat to be used in all its buildings throughout the U. S.

TEN REGULAR STOCK SIZES.
SPECIAL SIZES TO ORDER

CARY'S BALE BAND AND BUCKLES

THOSE WHO HAVE TRIED THEM SAY THEY ARE THE BEST



THE ABOVE SHOWS A BALE OF COTTON SECURELY FASTENED BY OUR BALE TIES AND BUCKLES
NOTE ITS NEAT AND COMPACT APPEARANCE
Buckle can be applied with the Locking or Hook part next to the Bale, so that there is no possibility of its getting caught in other Bales when piled together.
Also Manufacturers of

TWISTED AND FLAT WIRE BOX STRAPS and a FULL LINE OF SHIPPERS' SPECIALTIES.

Cary Manufacturing Company, 19 and 21 Roosevelt Street, NEW YORK, N. Y.

WILLIAM FIRTH, President. FRANK B. COMINS, Vice-Pres. & Treas.

The American Moistening Company
120 Franklin St., BOSTON, MASS.

Received the Highest Award on recommendation of the Franklin Institute for

"Simplicity and Originality of Design"

Is the largest manufacturer of Humidifiers in the world. The last twenty years receiving the Highest awards in this country and Europe for its Air-Moistening System. Eight Gold Medals and others.

The Only Perfect System of Air Moistening
And Has Been Adopted by the Representative Manufacturers of this Country.

The only System adopted in the Textile Schools. Write for Booklet "T" on Humidification. Legal proceedings will at once be taken against infringers and users of infringements.

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OF
New Improved High-Grade Chicago Real Estate.

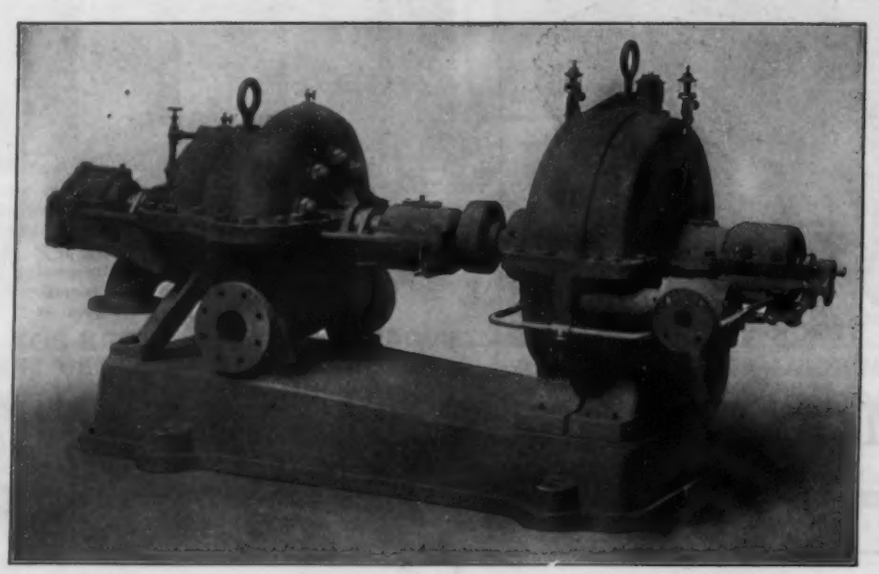
The Chicago Title & Trust Company, capital $5,000,000, acts as trustee, guarantees the Titles and certifies on each loan as to its genuineness.

No investor has ever lost a dollar of principal or interest on any bond or mortgage bought through us.

Write for circular A705 of Bonds and Mortgages.

AMERICAN BOND & MORTGAGE COMPANY
Bank Floor Royal Insurance Building
167-169 Jackson Boulevard - - CHICAGO

WESTINGHOUSE Boiler Feed Pumps



Westinghouse 250 g. p. m. Boiler Feed Pump and Driving Turbine

Turbine-driven boiler feed pumps are the accepted standard.

To insure their excellence in every detail, we build both turbine and pump in our own shop. No other builder has at his command a combined turbine and pump experience such as is brought to bear on the design and construction of these outfits at East Pittsburgh.

The Westinghouse Machine Company

Prime Movers and Auxiliaries **EAST PITTSBURGH, PA.**

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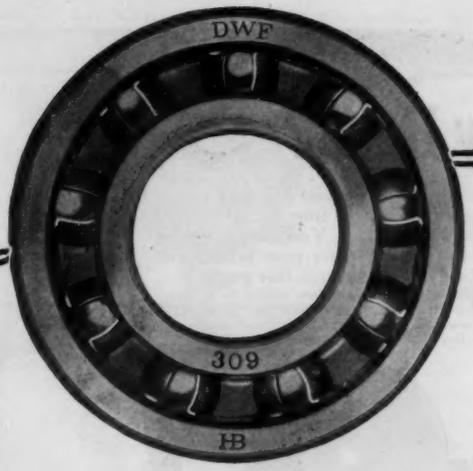
Boston, 201 Devonshire Street
Atlanta, Candler Building
Pittsburgh, Westinghouse Bldg.
Cleveland, Swetland Bldg.
Chicago, 39 South La Salle St.
Philadelphia, N. American Bldg.
Cincinnati, 1106 Traction Bldg.
San Francisco, Hunt, Mirk & Co.
Denver, 1062 Gas & Electric Bldg.
Mexico, Compania Ingeniera Importadora y Contratista, S. A. (successors to G. & O Braniff & Co.), City of Mexico.



FACTS

Worth Knowing

about

HESS-BRIGHT

Ball Bearings and Hangers

We have recently said much about the economy of using Hess-Bright Ball Bearing Line Shaft Hangers. But we have said little about the special advantages of the Hess-Bright Type of Annular Ball Bearings.

The best statement of these advantages is to be found in the story of the technical laboratory tests from which Hess-Brights originated.

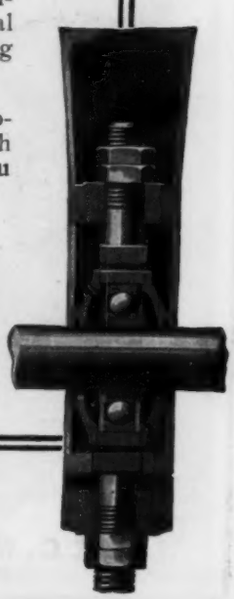
About eleven years ago the German Small Arms and Ammunition Factories of Berlin resolved to investigate the shortcomings of the types of anti-friction bearings then in use, and to determine the requirements of a genuinely efficient and durable bearing. Accordingly Professor Stribeck, of the Neubabelsberg Technical Laboratories, with a large corps of able assistants, was given carte blanche.

Ball and roller bearings of all types then used were scientifically tested for load ability and endurance; new types were evolved; materials were investigated; the relative ability of small and large balls and of short and long rollers was determined.

Years of time were devoted to the research, and a veritable fortune was expended.

What was done; what types were rejected and why; how the modern steel alloys aided in the final solution; how a wholly new type of ball bearing was at length adopted as the most durable of all possible forms; how specialized machinery and delicate instruments of precision aided in the final embodiment of the ideal —all these things are told in the Hess-Bright General Catalog. It is a fascinating text-book for every engineer interested in anti-friction economies.

When you select an engine, a boiler, a machine tool, you do not buy the cheapest to be had, regardless of lasting qualities or efficient performance. It is worth your while to investigate and see that you get the bearing that will serve you best for the longest term.



THE HESS-BRIGHT MANUFACTURING COMPANY

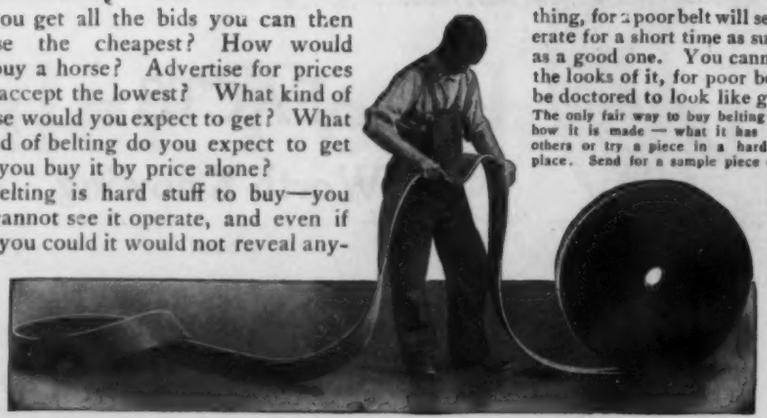
51 East Erie Avenue **Philadelphia, Pa.**

How Do *You* Buy Belts?

Do you get all the bids you can then choose the cheapest? How would you buy a horse? Advertise for prices and accept the lowest? What kind of horse would you expect to get? What kind of belting do you expect to get if you buy it by price alone?

Belting is hard stuff to buy—you cannot see it operate, and even if you could it would not reveal anything, for a poor belt will seem to operate for a short time as successfully as a good one. You cannot tell by the looks of it, for poor belting can be doctored to look like good.

The only fair way to buy belting is to find how it is made — what it has done for others or try a piece in a hard service place. Send for a sample piece of



and our catalog that shows the various processes of manufacture, tells how to lace a belt, gives rules for figuring belting, horse power, etc. Look this sample over carefully—test it—then select the

Cocheco Belting

most severe place in your factory and order a *Cocheco Belt* for *that* place. The *belt itself*, after a fair period of service, will convince you that Cocheco Belting is the *best* belting you can buy for any service.

Send for catalog and the free sample piece now.

I. B. WILLIAMS & SONS, Dover, N. H.

14-16 N. Franklin St. Chicago, Ill. — 72 Murray St. New York City — 155 Summer St. Boston, Mass.

YOUR HOSIERY CLOTH AND YARN SINGEING

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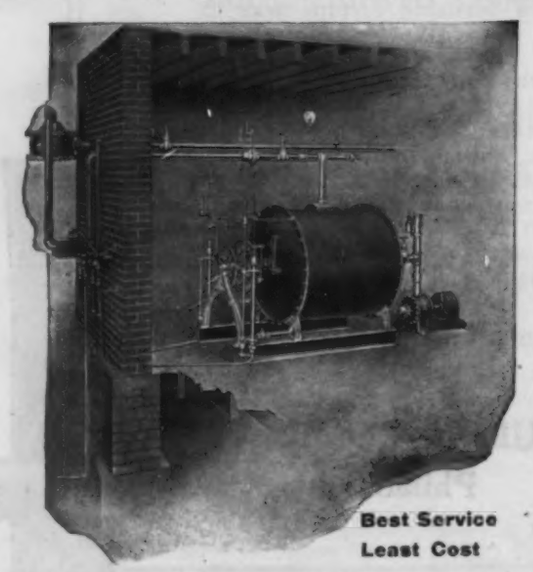

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A widespread interest is being manifested in the special train which will be operated from Macon to Washington, leaving Macon at 10:00 A. M. March 1, via Central of Georgia Railway, and Seaboard Air Line Railway.

This train will consist of electrically lighted Pullman sleeping cars and dining car, and in addition to the Macon military companies, the Macon Drum and Bugle Corps and the Sons of Veterans, many representative men and women from Middle, South and Southwest Georgia will join the party and witness the inaugural ceremonies, which make Woodrow Wilson president.

The train is expected to arrive Washington at 10:00 A. M. March 2, passing Atlanta, Raleigh, Richmond, Fredericksburg, and into Washington along the banks of the historic Potomac river.

Arrangements will probably be made for the members of the National Guard, the Drum Corps and the other organizations to pay their respects to the governors of North Carolina and Virginia, as Raleigh and Richmond are passed.

Very low fares for individuals with liberal stop-over privileges, and also party fares for twenty-five or more on one ticket, have been authorized from practically all points.

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Reservations on the big special train may be secured by communicating directly, or through your agent, with Mr. John W. Blount, District Passenger Agent,

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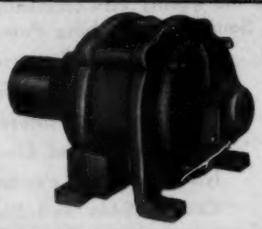
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Motors Designed Solely for Textile Mills

Loom Motor

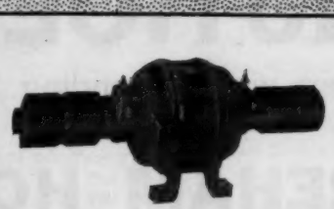
Electrical and mechanical features of G. E. textile mill motors were determine l by a careful study of each machine used in the textile industry.

These motors embody the experience of twenty years during which they have been preeminent in the textile industry. This is shown by the fact that over 75% of all electric power used in the textile mills of this country passes through G. E. motors.

Minimum Attention

Where a small amount of power is required totally enclosed motors are furnished which minimize the attention required

Waste packed bearings are used on motors for the individual driving of looms. They have been known to run 2 years without attention and with them oil fly is impossible.


Four Frame Drive Motor

Cool Operation Assured

The active magnetic material of motors made by the General Electric Co. is exposed to the air. No dead air spaces (such good heat insultors) are found in the construction of these motors.

These are carefully avoided in designing the motors, and guarded against in their machining and assembly.

Cool operation is also assured by running the completed motor under load conditions.

Electrical Characteristics Designed Especially to Suit the Machine Driven.

A few of the many designs of alternating current G. E. Motors which were designed solely for textile mill power are shown on this page. Electrically the motors vary, for "high efficiency" is necessary to reduce the cost of power to a minimum; high "power factor" is essential to keep down the investment at the generating plant; small "slip" is required to furnish the best speed regulation. The "starting torque" required to quickly and smoothly bring the motors up to speed must also be provided.

Each textile machine requires its own combination of these features in a driving motor. We make all the combinations and keep them strictly up to date by embracing every good feature of contemporary motor design.

Our textile mill specialists will carefully study your drive conditions and recommend an electric drive which will satisfy you.

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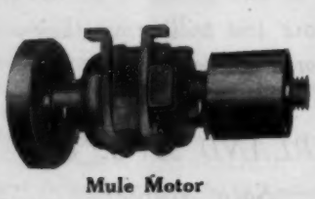
3542

Mill Power Department

Boston, Mass.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GARLAND MFG. CO.
Saco, Maine.

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COTTON

PUBLISHED MONTHLY

Vol. 77, No. 4 FEBRUARY, 1913.

PUBLICATION OFFICE
DALTON, GA.

EDITORIAL and ADVERTISING DEPARTMENTS
GRANT BUILDING, ATLANTA, GA.

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SUBSCRIPTION RATES.

Domestic .....$1.00 for Two Years
Foreign .....$1.50 Per Year
Canada .....$1.00 Per Year

Complaints of failure to receive Cotton regularly or of errors of any nature relating to subscriptions should be promptly made to the Atlanta office.

Orders for any change in advertisements must reach Atlanta previous to the 10th of the month preceding month of issue, otherwise publishers cannot be responsible for changes.

Entered at Dalton, Ga., Postoffice as Second-class Matter.

CONTENTS.

Editorial—
Labor and Wages 131
Vote on the Question of a National Budget..... 133
Scientific Positions as Political Assets 133
Good Manners Prevent Strikes 134

General—
Benign Protection 135
A Review of the British Cotton Trade for 1912..... 138
How to Sample Coal 140

Mill Conditions and Market Reviews—
Southern Mill Situation 142
New England Mill Situation..... 143
Cotton Crop Conditions and a Review of the Market..... 144
The knit Goods Market 145
The Yarn Market 146

Cotton Manufacturing—
Causes of Defective Yarn and Roving 147
The Weaving of Seamless Felts for Paper Makers..... 151

Knitting—
Influence of Twist on Yarn 153
Artificial Silk, Its Manufacture and Uses..... 155

Dyeing, Bleaching and Finishing—
The Value of Commercial Starches for Cotton Mill Purposes 158

Practical Problems Discussed by Cotton's Readers.....162

New Machinery and Trade Notes 165

LABOR AND WAGES.

Significant unanimity is found on the proposition that labor constitutes the chief problem of the cotton manufacturer. Mechanical processes have been so definitely standardized, and manufacturers of equipment have gone so far in perfecting their product that as far as machinery is concerned the textile manufacturer is probably in a somewhat better position than his conferes in other lines of manufacture. These are perhaps newer, and consequently the matter of special machines has not been worked out to the final and perfect stage.

If the operator of a cotton mill could wipe off the slate all the troubles and worries and petty vexations that flow from the one big question of labor, his position, while perhaps not ideal, would be advanced a good many steps in the direction of the millenium. But labor problems are present and pressing, important and seemingly inevitable. The human factor is almost the "X" of his business equation.

Securing good and permanent help is the chief question that pertains to labor. Achieving the *summum bonum* of having employees take an intelligent interest in what they are doing, mastering the machines they are in charge of, and then sticking to the appointed task as steadily and persistently as do skilled workers in some other lines of endeavor, is the goal toward which the efforts of owners, agents, superintendents and overseers are bent. The fact remains, however, that in a great many cases the employer has to confess that he not only has insufficient help, but that what he does have is far below the standard of 100 per cent efficiency.

And the arbitrary symbol of 100 per cent does not mean the greatest possible amount of labor, nor the highest possible development as to technical ability; but simply what, under normal conditions of intelligence, strength and interest, an employer has a right to expect of those from whom he is buying labor. Obviously, then, the present system of handling labor is wrong, or else it must be admitted that the general character of the labor attracted to the mills is not of a type capable of development in the right direction.

The latter horn of the dilemma is hardly the logical one, for the reason that in the Southern mill, at all events, the manufacturer gets a grade of native labor probably unsurpassed by any other section and which, when directed into other channels, appears to serve with general satisfaction to the employer. Assuming that it is not of the highest possible type, it must be admitted at the same time that it is flexible, capable of being educated, and potentially, at least, generally efficient. What, then, of the system under which it is handled?

It is a basic law of economics that values, like water, tend to seek their own levels. Offer a given price for any commodity in the industrial world, from cotton to fabrics, from boots to balloons, from legal advice to labor—*and you get just about what you pay for.* You don't expect to get a "Packard Six" for the price of a "Ford Model T," nor a high-grade woolen suit for the price quoted on shoddy.

Yet, in entering the labor field, employers sometimes expect to buy high-grade goods in this line without paying the market price offered for that particular class of service. Advertisements are often seen offering $1.75 to $2.00 per day for the services of a master mechanic, who is supposed to not only possess the requisite knowledge to adequately repair all classes of mill machinery, but also to take active charge of the power plant with a cross compound, condensing engine and its accessories. As one Southern manufacturer says, "So many mills base their production cost on 75 cent card hand labor, when it would be far more economical to base it on $1.50 card hand labor."

But it must be conceded that the cotton manufacturer, like other members of the textile trade, would be willing to pay as much as his employees are worth to him; to give them all that they earn. As a matter of fact, a great deal of money is spent in educating beginners in the mill, and they draw out of the business a far greater amount than they put into it. Hence, to all appearances, the average mill man is going as far as possible in the direction of giving his employees the fair return for their labor to which they are entitled, and which, it would seem, would result in producing a much more efficient class of labor.

That is the surface view. Look a little more closely, and consider this question: Is the manufacturer using the system of payment which is designed to develop the greatest amount of intelligent interest, pointed out above as a necessary prerequisite to the right kind of results? To put it even more plainly, is the usual day wage system of remuneration the best possible plan of payment that can be devised? That might be called a purely rhetorical question, for in view of the general situation which prevails the obvious answer is, no.

It is a peculiar fact that although a system of payment based on production has been found to be the best possible plan in nearly every other line of work, the textile interests have been slow to take it up, and have clung to the day-wage idea with a tenacity hardly justified by the results of their previous experience with it. The willingness to try something new, which is found in connection with mechanical appliances, as a general rule, is strangely absent from the mental attitude of those who have had occasion to consider a change in the methods of labor compensation.

Yet, in a number of large plants where it has been in use for a sufficiently long period to enable the plan to be tested, the success which has been recorded has been sufficiently impressive to convince the most skeptical. Here is the experience of a large spinner in an Ohio Valley city, who adopted the piecework plan of payment, not basing the returns to the operative on the number of sides tended, but on the number of pounds produced, so that actual production, and nothing else, was considered. The average wage paid in the plant prior to the adoption of the system was something like $1.50 a day. Today it is higher than that, while many of the skilled operatives are earning from $2 to $2.25 a day. The number of employees who have come to the plant and left it has been greatly reduced; in other words, the personnel of the factory force has become more permanent. The employees are satisfied, because they are earning more money than they did under the old system; and the heads of the plant are pleased, because they are getting better results from their expenditure for labor, and are having less trouble on acount of the necessity of finding new help to replace those who quit.

That this last is a highly important consideration is indicated by the experience of a Southern sheeting mill, which at last reports had only about 75 per cent of the employees it needed to operate its plant full time. Yet during the past twelve months it has had on its payrolls, at one time or another, over twice as many hands as would enable the mill to be run full capacity. The answer is plain—those who came to learn refused to stay.

This is not alone important from the standpoint of overpayment for the labor put in during the period of learning, though as a matter of fact paying a beginner around 75 cents a day during that time is a costly operation for the manufacturer, who, it is certain, does not realize nearly that much from the production of the learner; but it is equally true that the efficiency of the equipment is greatly reduced, and the problem of earning enough to pay a fair investment charge on machinery that is operated at only a small percentage of its normal efficiency is no slight one. Power is wasted, machines are idle (as far as actual production is concerned) a large part of the time, and the overhead expense is greatly increased—simply because a large percentage of those employed in the mill are not sufficiently skilled to run the machines at a fair rate.

Thus it is plain that the solution of the labor problem depends chiefly on securing permanent labor that is sufficiently skillful to produce approximately 100 per cent of productive efficiency from the machines they operate; and securing this permanency of occupation hinges chiefly on making the remuneration sufficiently large to hold this labor in place, against the competitive influences of employment in other branches and domestic labor. Under the piecework system the capacity of the operative is not increased, but her interest is stimulated by the possibility of earning more; there is a smaller margin between actual production and possible output; and the two more nearly coincide as the skilled worker, seeing the opportunity to reach a figure that would never have been touched under the old day wage system, concentrates all her energies upon making each spindle or machine she is tending produce the greatest possible amount of finished product.

Unless you can awaken ambition, furnish incentive and provide the mental exhilaration that comes from a contest—in this case the operative against the machine—the production of each unit of the equipment and each unit of the labor organization is not going to reach its maximum. When you do provide these factors, output is certain to go higher, and successful direction of labor is much more likely to be realized.

When a mill is operated by skilled employees, who have been in their places long enough to have become thoroughly acquainted with their duties and the possibilities of their machines, the production per machine is much larger than when beginners or those who have only gone half the way toward the position of experts are employed. That means that the mill with a labor force of the right kind can turn out a given production with a much smaller investment in machinery than when it is forced to man its equipment with the undesirable type of worker. When it is necessary to earn dividends on a capital investment represented in machinery which is running below its normal possibilities as to production, you have an initial burden which all the arts of management and salesmanship can hardly overcome.

In a Georgia mill where the piecework system of spinning was adopted, earlier investigation showed that on the day wage plan the average machine production was practically 80 per cent of its real capacity. When piecework rates were inaugurated a gradual improvement was noted

through succeeding weeks until a new high average was reached and 92 per cent of possible production established; a spinner's earnings increasing in the meantime from $8.65 per week to $9.55 per week.

On another class of yarn in this same mill on which 100 per cent production would be 54½ hanks per week, the actual production on the "side" basis was 44 hanks per week, or 80.7 per cent, while the actual production under the "hank" or piecework basis was 47 hanks per week, or 86.2 per cent production. The spinner's pay on the side basis was $7.90 per week and on the hank basis, $8.75 per week.

The increased production in this particular mill resulting from the adoption of the piecework system allowed the changing over of 14 frames onto another class of yarn. It showed a net saving of $27.35 a week in actual labor on spinning. It made a saving in doffers' wages of $9.60 a week and at the same time increased doffers' wages 40 per cent, or to an average of $1.40 a day.

A well-known agent of a large Southern mill, who has tried out this piecework proposition, said recently that he had decided to try still another plan in the development of the piecework idea. This was to contract the work to the spinners, allotting them as many machines as they could handle satisfactorily and allowing them to hire their own assistants, including doffers.

A further indication of the intimate relation of wages to labor and production is shown by the results at another mill. Ten years ago a new mill was built and began operation. That mill today with its machinery now ten years old, making the same goods and selling them to the same customer, has during this period reduced the working hours 10 per cent; increased wages 40 per cent; and increased production 33 per cent. The difference between the price of the raw material and the price of the finished goods has in the meantime been greatly reduced. The poundage cost has slightly increased, but this increase is more than compensated for by the decrease in the amount of "seconds."

In planning the installation of a piecework system, a good many factors are to be considered. First, there is the question of the average production of each type of machine under present conditions. Then it must be determined how far above that is the production of the machine, operated at what should be considered a normal rate. Care should be taken not to adopt a plan which would require undue speeding of the operatives in order to get a production sufficient to result in the wage formerly enjoyed; but it can, in nearly every case, be put at a figure which will require somewhat more energetic efforts than were formerly put forth. This results, usually, in the employee actually thinking about her work and how to increase output, and for the first time makes her interests and that of her employer actually, as they have been nominally, mutual.

When the piecework system is in effect, the labor expense of a given lot of goods can be figured to the fraction. Without it, that element of cost is always uncertain and variable. In these days of cost-accounting and accuracy in figuring expense pertaining to production, such a knowledge of labor is a tremendous advantage, enabling the manufacturer to determine how far he can go in fixing his quotations. But it is only one of the numerous benefits flowing from the use of a piecework system carefully and intelligently installed, rightly lived up to and adapted according to the individual needs of the mill.

VOTE ON THE QUESTION OF A NATIONAL BUDGET.

The question of the plan for a national budget was submitted to referendum in the Chamber of Commerce of the United States of America on November 30, 1912 and 45 days were allowed to the constituent members in which to consider the question and record their vote. The time expired on January 14, 1913, and the vote has now been canvassed and made public by Elliot H. Goodwin, general secretary.

This vote complies with the provisions of paragraph 2 of Section 4 of Article X of the By-Laws and is binding upon the Chamber.

Copies of the Referendum were sent to a selected list of organizations not affiliated with the Chamber with a request that they record their opinion in order that the vote might be more fully representative of business opinion in all parts of the United States. Twenty-eight organizations casting 63 votes availed themselves of this privilege.

The total vote of all organizations that took part in this Referendum is given in the following table. Each association is entitled to votes from 1 to 10 in accordance with the number of its members.

Number of organizations voting	152
Number of votes cast	583
Number of votes in favor	573
Number of votes opposed	10
Number of States represented	34
Divisions other than States represented	District of Columbia and Hawaii

The only states not represented by organizations voting on this question were: Alabama, Arizona, Idaho, Montana, Nevada, New Hampshire, New Mexico, Oklahoma, Rhode Island, South Dakota, Tennessee, Utah, Vermont and Wyoming.

SCIENTIFIC POSITIONS AS POLITICAL ASSETS.

(By Our Washington Correspondent.)

In the political arena, "To the victor belongs the spoils." To some extent, however, our government has wisely changed this ancient doctrine, as evidenced by the Civil Service, and the merit system of promotion. But with the advent of a new administration many officials are changed because of political aspirations, and without due regard to their experience and value. Many of these officers should not be disturbed, for obviously their training and knowledge gained through past experience is of vital importance to the public, and indeed to the incoming administration, and for these reasons certain official places at least should be exempt from politics.

A notable illustration is that of the United States patent office. If a competent and efficient man be found filling the office of Commissioner of Patents, and one whose office has prospered under his administration, why displace him solely on the ground of politics?

The business of the Patent Office has been so judiciously handled in the last seven or eight years that it would amount to a national calamity to disturb the present executive head of this important bureau. The inventor's interests have been carefully safeguarded; the salaries of its employees

increased; and efforts instituted which bear promise of successful fruition in the near future to secure a new building of modern construction adapted to the needs of that important and growing bureau. Treaties of great value to the Patent System have been entered into with foreign countries, and for the first time in the history of our government the Congress has been brought to a full realization of the importance of the Patent System to the people of our country, as well as to the necessity for the exercise of the proper fostering care of that system in the granting of the requisite facilities to the Patent Office in the administration of the laws enacted for the carrying out of the same.

These results have been accomplished by the present head of the Patent Office. If he be supplanted, this work of reform will be halted, if not entirely abandoned. His successor of necessity would not be familiar with the difficulties experienced by the present incumbent in securing the results already accomplished, as well as the progress made in the obtaining from Congress those things necessary, such as the proposed new building, the further increase of the salaries of employees, and the provision of adequate force to efficiently handle the work. Are the important interests of the inventors of the country, so dependent as they are on a proper administration of the Patent Office, to be endangered merely because of a change of administration and the desire to reward some aspirant for office, thus making this important bureau, with its vast commercial ramifications, the foot ball of political preferment?

A wise patriotism must give an emphatic negative to such a proposal. The Patent Office of necessity differs in its scope from other bureaus of the Government. It is scientific in its nature, and includes among its employees many men who hold degrees from the leading universities and technical schools, whose salaries are not commensurate with the service which they render, and as paid by outside interests.

The Patent Office has always been a self supporting institution, the fees received from the inventors has steadily increased, until today the balance in the Treasury to the credit of the Patent Office amounts to more than seven million dollars.

Never in the history of our Patent Office system have the conditions been so favorable for efficient service and future improvements, and this is largely due to the efforts of the present Commissioner of Patents.

Because of interests involved, and the technical knowledge required, what advantage would be gained by deposing an efficient government official to make place for an inexperienced aspirant for office.

It has repeatedly been suggested in the House and Senate that this particular bureau should be entirely removed from politics, for every member of Congress is made the bureau of complaint for such of his constituents who have criticisms to make of neglect of their individual interest by any bureau of the departments in which they may have pending matters. Congress is thus the barometer which shows a satisfactory and just administration of this particular bureau and one which has caused a complete absence of complaint, or criticism relative to the work thereof.

The present high standard of efficiency in the Patent Office is due largely to the fact that the higher officials, including the present Commissioner, are the product of the office. These men have risen from the ranks and know the necessities of the Bureau, which makes it all the more essential that a broad view be taken of the entire matter, and insist that this office is strictly a non-partisan one.

The country is to be congratulated, and this without regard to divergent political views of our citizens, on the fact that President-elect Wilson is not a spoilsman in the political sense of that term, and his public utterances give evidence that his mind is directed more to the higher measures affecting the public weal, such as the tariff and the trusts, than it is to the spoils of political victory. He realizes that to the great number of our citizens these national questions mean more than does the fact that one individual is supplanted in office by another.

We confidently believe that after he shall have successfully determined these greater questions, and taken up the question of changes in office, he will be found with an open mind and disposed to realize the importance of the Patent System, as well as the danger of disturbing existing conditions, which have brought such system to its present high standard, and which if undisturbed give bright promise for its future.

GOOD MANNERS PREVENT STRIKES.

The development of the corporation, with its impersonal machinery, has made this question of personal contact a difficult one. The International Paper Company, which has just passed through a series of strikes, has attempted to reach the men by an industrial engineer, who devotes all his time to keeping in touch with the men.

That is really the gist of the situation; this personal equation. Any manager of a year's experience knows how difficult it is to get shop foremen. The best workman does not always make the best foreman. It requires personal endowments that are above skill; the "capacity to handle men," we call it. But it really is the capacity to use men without handling them.

Here is an illustration told by S. E. Heberling, president of the International Switchmen's Union: "A few years ago a big strike occurred in the Northwest. It was really brought on by two men who were temperamentally out of tune. The switchmen's committee finally arranged a meeting with the railroad officials' committees. Now the heads of these two committees clashed, neither exercised the diplomacy the occasion demanded, neither acted as a representative should act, and a strike followed."

The average man needs personal recognition and the average employer is too apt to overlook this basic trait. Many a man joins a union through his craving for fellowship, and he knows the employer and the foreman are only human beings like himself.

This is what Henry Abrahams, secretary of the Boston Cigar Makers' Union, meant when he related his experience in adjusting a dispute which recently threatened a Boston shop with disruption. "I found the men in a discontented mood. Not over wages or hours, but over something the boss had neglected. So I went to the employer and told him to say 'Good morning' to the boys when he came down to the shop. He looked at me in surprise. He supposed his duty was done when he complied with the law and paid the wages. A personal kind word is a cheap remedy for half the trouble an employer has with his men."—*World's Work* for February.

BENIGN PROTECTION.

More About the High Cost of Living—The Cause and Remedy—The Competitive System and Socialism—It Is Only by the Elimination of Waste Labor That Labor as a Class Can Come into Its Rightful Inheritance.

(Contributed to COTTON)

BY FRED W. SIMONS, EX-PRESIDENT NATIONAL ASSOCIATION OF HOSIERY AND UNDERWEAR MANUFACTURERS.

CHAPTER 5.

(Copyright by the Author).

I wish to express my appreciation of Prof. King's attitude and as I can assure him not only of good will but also of high personal esteem we may each fire away without danger of doing any damage except to the theories advanced by the other.

Yes, I am glad to learn that the political economists are teaching some truth, but they have an awful task before them if they expect ever to compensate the world for the damage they have done by propogating the free trade theory. It took me twenty years to find my way out of that maze of sophistry even after I was convinced that it must have a fatal defect somewhere. I fear that I have not yet quite forgiven them for misleading me, which fact may have led me to criticise them with undue severity.

This, however, is not so bad as too much leniency, so for good measure and to make sure I don't err in the latter way, I will add in response to Prof. King's remark that "Mr. Simons apparently takes the position of the typical business man who has no use for theory any way," that insofar as speculative theory is concerned, he is correct. I find such theory too frequently at variance with fact, and experience has taught me that when fact and theory are at variance there is generally something the matter with the theory. I have a great deal of use, however, for that kind of theory which consists of a clean-cut statement of facts and a wise and broad interpretation of their significance.

The trouble with our Savants is that they are theorists only, their very erudition seems to have a tendency to disqualify them for the consideration of practical questions. It is doubtless true, as the Professor says, that their theories are "formulated only after careful and exhaustive study by many men who have devoted years perhaps to this particular problem," but they lack the invaluable, I had almost said indispensable, aid of physical contact with the elements out of which they must construct their theories. The result is that they deduce from deductions and build theories out of theories, without verifying the facts upon which their original theories were predicated; consequently when they make a mistake there is nothing to bring it home to their consciousness with adequate forcefulness, and it stays with them.

I cannot agree with the Professor when he says that while my definition of political economy is sufficiently correct for practical purposes, yet "it does not necessarily follow that the business man is the one best fitted to work out the science of business." I hold that the men who are best able to plan and carry out great business projects for their own benefit are best able to do the same thing for the general welfare, and further, that they don't have to quit doing the former in order to do the latter. It is quite true that "in this day of specialization the man who succeeds in business has little time to devote to the general problems of business from the social standpoint," but he must take time to do it. It is his job, and it is his job because he of all men is best qualified to perform it.

I am of opinion that the sociological student, even if he specializes in political economy or any other branch, can best serve his day and generation by gathering and truthfully presenting facts and conditions rather than by formulating theories. He is perhaps well qualified to tell the man of affairs what the welfare of society demands, what must be done—but not how to do it.

Perhaps I can best make my position in this matter clear by quoting from Thomas Carlyle, who fully realized his own limitations in this regard. He says:

"For the rest, let not any Parliament, Aristocracy, Millocracy, or Member of the Governing Class, ask again with the least anger, of this Editor, what is to be done, how that alarming problem of the Working Classes is to be managed? Editors are not here, foremost of all, to say How. An Editor's stipulated work is to apprise thee that it must be done. The 'way to do it' is to try it, knowing that thou shalt die if it be not done. There is the bare back, there is the web of cloth; thou shalt cut me a coat to cover the bare back, thou whose trade it is. 'Impossible?' Hapless Fraction, dost thou discern the Fate there, half unveiling herself in the gloom of the future, with her gibbet-cords, her steel-whips, and every authentic Tailor's Hell; waiting to see whether it is 'possible?' Out with my scissors, and cut that cloth or thy own windpipe!"

The quotation is from Carlyle's "Past and Present," and the Professor may regard that volume as one of the textbooks I "would deign to preserve." Of scarcely more than pamphlet size, it is of more value as a beacon light than all Adam Smith or David Ricardo or John Stuart Mill ever wrote. True, Carlyle builds no structure, nor pretends to build any, but he lays a foundation, or rather calls attention to a foundation laid from eternity upon which we builders persistently refuse to build.

I must ask the Professor's permission to continue using the word "value" in its commonly accepted sense, for several reasons, one of which is that I don't wish to be deprived of the use of the word in that sense, but shall have no need during this discussion to use it as defined by him.

The Professor will please call to mind that he said he would endeavor to present his case "in such a form as to be intelligible to the man who is not versed in the terminology of Political Economy." I am not accustomed to think in technical terms and should probably find the effort to do so confusing; perhaps some of our readers might find it so, too. Moreover, I cannot take the Professor seriously when he protests that he does not know the meaning of the term "intrinsic value," and greatly doubts if it has any clear meaning. I explained what I meant by it when I used it.

Both words are in common use singly and in combination; they may be found in any standard dictionary, and Noah Webster uses the term "intrinsic value" to illustrate the application of the word "intrinsic."

The Professor is simply sparring. I dearly love an argument myself, and like to win, of course; but in this case I am not seeking wrangler's honors; I am seeking an opportunity to present what I believe to be the truth upon a subject of great importance, and I thank the Professor for his criticisms, which aid me greatly. I will not wilfully misconstrue any argument that he may set forth. I will endeavor to grasp the full meaning of his every expression; will weigh it conscientiously and will not contend a moment against what seems to me to be true. I ask the Professor to govern himself accordingly, and I am sure he will do it.

I would like to stop "quibbing about words" right now, and "get down to brass tacks," as the Professor has suggested, but I can't let him get away unchallenged with the contention that the merchant is just as much producer as the farmer or manufacturer.

Of course, there is a sense in which the merchant produces his goods. He produces them when he takes them off his shelves and hands them to his customers; but there is a distinct and very important difference between the sense in which the merchant is a producer and the sense in which the farmer and the manufacturer are producers.

The latter make what they produce; create what they produce, if you please. The farmer makes or creates the potato; the watchmaker creates or makes the watch; the tailor makes or creates the suit of clothes. They don't make or create the elements or substances out of which those commodities are constructed, but they change the form of them and make or create the potato, the watch and the suit of clothes. If this distinction is still too obscure to be recognized, let the Professor take into consideration the fact that if the farmer and manufacturer were producers only in the same limited sense in which the merchant is a producer, there would be absolutely nothing procured.

The merchant's calling is as honorable as that of the farmer or manufacturer and his services are indispensable, but there is a difference in the functions he performs of sufficient importance to demand distinct terms to indicate them. To the ordinary individual, the farmer and the manufacturer are producers and the merchant is a distributor, and the political economists are not going to clarify their own mental vision or the mental vision of anyone by obliterating the distinction.

The distinction in question is more than important—it is vital, and a recognition of it is indispensable to a correct understanding of the causes which have produced the high cost of living phenomena and equally indispensable to the formulation of any efficient remedy.

I have before me at the present time a copy of "A Study of Trolley Light Freight Service, and Philadelphia Markets in Their Bearing on the Cost of Farm Produce," by Clyde Lyndon King, Ph.D., Wharton School of Finance and Commerce, University of Pennsylvania, "made under the direction of Rudolph Blankenberg, mayor of Philadelphia," and published October, 1912. Perhaps the title sufficiently indicates the purpose for which the investigation was made. I find in this report a "table giving the price received by the producer and each middle man and the per cent of increase of each price over the preceding price, together with the total increase of consumers' prices over producers' prices." Out of thirteen articles enumerated, the one showing the smallest increase is high-grade eggs at 67 per cent, and the one showing the largest increase, low-grade live poultry at 266 per cent, the average for the thirteen articles being 136 per cent increase of consumer's price over producer's price.

I have before me also a copy of "The Incomes of American Families," by E. Dana Durand, director of census, in which Mr. Durand states that the average working man's family in this country expends approximately 52 per cent of its income for food and fuel, 12 per cent for clothing, 18 per cent for rent and the remaining 18 per cent for all other expenses.

Now, if the people as producers sell the products of their labor for half the price they pay for them as consumers, what—Oh well, what's the use? The high cost of living problem is altogether too intricate for solution, joint committees of Congress having failed in the attempt, we now demand an international commission of inquiry.

In fairness, however, we must admit that the government has had thrust upon it for solution problems that do not properly belong to the domain of statesmanship. The "high cost of living" is not a problem in government, but a problem in business, and it would never have assumed the proportions of a serious national problem at all, except for the defective business methods to which it owes its origin. We frequently hear it said and with much truth that we need business men in Congress, but it is equally true that we need statesmanship in business. By that I do not mean that the government should interfere unnecessarily with business, but that business men, and especially those business men of dominating genius, who so largely determine the form that business shall take and the methods that shall be employed, should carefully study their chosen methods and endeavor to discern what will be their ultimate effect upon the welfare of the people. That is what I mean when I say that we need statesmanship in business.

I am satisfied that no class of men in existence are more straightforward and honorable than our great business men and captains of industry, but the "square deal" is not sufficient if the tendency of the methods employed is to bring about such conditions as at present obtain; and I think they themselves would be the first to admit that if existing conditions are the result of the business methods now in use then there is something wrong with the methods.

The high cost of living is for the most part the result of an enormous and steadily increasing cost of distribution, which in turn is the result of bad business statesmanship in following the line of least resistance in securing business without taking into consideration the ultimate effect of the policy pursued upon the public welfare and so upon business itself.

The remedy is to cut the cost of distribution in half, giving the people the benefit of the reduction, thereby enormously increasing their purchasing power and creating a demand for labor in the fields of production that will absorb the superfluous labor it will displace in the fields of distribution.

Impossible? O well, then; no radical cure is possible, and we are destined to witness a steady contraction of human liberty and freedom as the result of the continual encroachment of an utterly impractical socialism.

There is a new field of enterprise, a new kind of business awaiting exploitation; the business of seeing to it that when the people buy merchandise they don't pay for anything else. The margin is ample and the field unlimited, and

the only reason that I can imagine for the fact that it has escaped the vigilant eyes of our great business men for so long is that they have been too busily engaged promoting production and developing the natural resources of the country to notice the mischief we have been doing with our tin horns and wax-work shows.

If the means to a given end are properly applied, the end will be accomplished, will it not? To state the question is to state an obvious truism. No well-informed person can seriously doubt the ability of the civilized world with its modern implements and methods of production to supply in superabundance every commodity necessary to the maintenance of a better and more comfortable standard of living than has yet been attained, for every single individual; and that without the necesity for the deadly strenuousness that is eating the soul of civilization.

The means exist but the end is not attained, and the end is not attained because the means are not used to attain the end—not used with that end in view. The system of unlimited competition for which we clamor so vociferously and so persistently makes no provision for supervision of the whole; it assumes with fatal inaccuracy that if every individual does the best he can for himself the best interests of the people as a whole will be served. It imposes no obligations beyond the letter of the law, and as Carlyle told us seventy years ago, it has not enough virtue in it to keep it from going rotten.

We are told that the competitive system is breaking down, and that the policy of "every man for himself and the devil take the hindermost" will not bring about the best possible conditions for the people as a whole; there being too many hindermost.

We are told on the other hand that we must either have competition or state socialism, otherwise monopoly will "enslave" us; and we proceed to lambast the ablest business men we have, "busting up" trusts, monopolies, magna charters and constitutions indiscriminately.

The competitive system has broken down in so far as it has failed to bring about the best possible conditions of society, and it will remain broken down so long as it stands only for utter selfishness. It imposes no obligation upon any one to protect the public interests and the public welfare and it places every man in conflict with the body politic. State socialishm would do precisely the same thing and destroy human freedom into the bargain.

After all nothing but a superficial knowledge of economic questions can be gained if we leave out of consideration the human factor; if we fail to note the best progress and present position of mankind in the intellectual and moral as well as in the physical material sense.

In the last analysis the high cost of living predicament in which we now find ourselves like most other troubles that overtake us is the result of our own cussedness; not alone the cussedness of the men upon whom we are trying to saddle the responsibility, but the cussedness of "We, the people."

The public thinks it needs protection against its most successful business men and it is seeking to obtain it by the enactment of laws; what it really needs is protection against itself at the hands of its great business men, who are perhaps alone able to extend it.

It is not possible to enact laws specifically prohibiting every kind of meanness that human nature is capable of, and if it was it would be impossible to enforce them. Moreover, every one is already prohibited by the decalogue. What we really need is a higher moral standard in business; a standard that will prompt the seller to protect the buyer instead of fishing for him with a costly bait and charging him with the bait.

That of course is about tantamount to saying that we will be all right when the millenium arrives. But we can't wait for the millenium, which will probably arrive on the installment plan, and we may depend on our great business men to lead us out of our present troubles—if we allow them to stay out of jail. If they don't do it because of the moral obligation resting upon them they will do it because it is to their interests to do it. Then we will proceed to get into some other troubles and so on until we learn to do things from a proper motive.

The competitive system is incomplete in that it makes no provision for supervision of the whole. There is no guiding hand, no supervising intelligence, either individual or collective, to direct the energies and activities of the people to the accomplishment of the end for which, primarily, they are expended—*viz.*, the progressively comfortable subsistance of the race. This deficiency results, as I have endeavored to point out, in an appalling waste of effort. Our individual enterprises are superbly managed, but efficiency terminates in the counting room and the balance sheet is the end of all things. The companies and regiments of our working armies are superbly trained but instead of fighting as allies for the subjugation of chaos, they are fighting each other—and the result is chaos indeed. A state of civil war exists in our economic life and we are devastating our own domain and trampling as spoils the fruits of our own labor, and the public foots the bill in the shape of "high cost of living." That's the way all war bills have been paid in the past, and will be paid in the future—ever more, Amen.

"Yes, I like a little competition," said Mr. Morgan, "but I like combination better." No wonder! Yet the competitive system is necessary in order to preserve the individual freedom of action without which liberty cannot exist, but the competitive system is without moral quality good or bad, and will work beneficially or injuriously as we may elect. At present we elect that it shall work injuriously. The thing to do is to supply the deficiency and provide for "supervision of the whole." We have captains of industry and merchant princes and kings of finance, but we have no field marshalls, no commanders-in-chief, no one to see that all the various forces are working together for a common end. As yet we don't even see the necessity for such supervision—but was ever any great enterprise accomplished without it?

Nor is it possible that any such enterprise can be successfully carried on by the government. It is to our great business men and not to our government that we have a right to look for a remedy. The men in command cannot escape this responsibility; it is useless for them to protest that they are not in supreme command; they are the supremest commanders we have. But as I have said these men have been very busy promoting production and developing the resources of the country; no doubt when we get through "investigating" them and give them a chance to take stock of conditions they will realize the obligations their ability and resources impose upon them and take up the task of eliminating waste in the distributive processes as they have already done in the productive processes.

The elimination of waste labor is the only remedy for Socialism, the only thing that will permanently check its growth. Socialism is really a product of the terrific struggle for existence experienced by the world's workers under the present industrial system; it attributes about all the troubles there are in the world to competition, and its avowed object and purpose is to overthrow the competitive system. How then can competition be the antidote for Socialism?

The Professor says he is "heartily in accord with Mr. Simons in admitting our debt to the Socialists for their part in pointing out the wastes of competition," but he never caught me in the act. My knowledge of the wastes in question is first hand knowledge gained by observation and experience in business. I am willing to admit that the Socialists know more about the troubles, trials and tribulations of mankind than anyone else—but they don't know "the way out."

It is only by the elimination of waste labor that labor can come completely into possession of its own; waste labor is labor's loss; nor is it capital's gain; it is no one's gain; it is absolute loss and it falls on labor. Mr. Roosevelt says he wants to see labor get a larger share of its products, but how can it reap products where there are no products? No, the merchant is not just as much a producer as the farmer or manufacturer—and the fact is important.

A REVIEW OF THE BRITISH COTTON TRADE FOR 1912.

Extracts From a Compilation by The Manchester Guardian.

When the year opened it found England in the throes of a formidable labor struggle which lasted till toward the end of January; during February and beyond there was a general strike in the coal industry which brought a great deal of suffering and much dislocation of trade; the problem of wages in the ring-spinning industry was formidable during the summer, and a dispute on the subject of compensation for injuries in a spinning mill became a menace to the industry in the autumn; the differences over "bad spinning" have been with them all the year, and are answerable for an attack on the Brooklands Agreement, in the meantime they have had two European wars; but in spite of it all the cotton trade has had an excellent year.

No doubt manufacturers suffered losses from the lock-out, which had, too, the effect of reducing spinners' margins, which were improving, but the industry has shown an extraordinary power of recuperation. They now seem far enough away from those recurrent agitations in favor of short time in the spinning trade, for the two branches of the industry seem to have reached something like a balance; it is frequently asserted that the increases in looms which are still going on will soon give the advantage to the spinners. It is very remarkable that the spinning mills about which all were so deeply concerned a few years ago should have been so soon assimilated into the industry; the forces which produced them may have been blind and those who shaped the enterprises rash, but without such rashness Lancashire could hardly have taken her great share in the expansion of the cotton trade. Fortunately there has been a strong demand for export yarns, and this, added to the great demand from home manufacturers, has placed spinners in a strong and improving position. Even now they are not doing as well as manufacturers generally, and among the manufacturers considerable difference must be recognized. Such a vast trade as that of Lancashire can never be evenly good or evenly bad, but there is no doubt about the general character of the year or of the generally favorable prospects.

The annual statistical record prepared by John Kidger, of Oldham, indicates that the result of the year—commonly taken as ending with November 30—is the best since 1908 in the spinning trade. Mr. Kidger takes 100 companies (not all the same companies as he took last year, though "for the purposes of averages the situation is unaffected"), and he finds that these have earned £15. 6s. per cent for 1912 on the paid-up share capital, against 15s. 11d. per cent for 1911. The dividends paid have only amounted to 7 1-5 per cent, but this is because of the prudent policy of the directors, who have greatly strengthened their reserves. This mean average of 7 1-5 per cent compares with 4 3-5 per cent in 1911, in which year, of course, a considerable call was made on reserves. Mr. Kidger calculates that the year's profit on the combined share and borrowed capital works out to a profit percentage of £10. 16s. 1d. Of course there is no selection of specially prosperous mills, nor of those in a particular section of the industry, and the irregularities of the trade are suggested by the fact that twenty-five out of the hundred did not declare a dividend. Mr. Kidger makes a further list of 110 companies which do not publish their profits, and these have paid a mean average dividend of 9 per cent against 6 per cent in 1911.

Another analysis of stocktaking results made by William Tattersall shows that out of 74 companies only one made a loss on the year's working. The profit on the share capital is 12.7 per cent, as compared with 1.06 per cent last year. On share and loan capital combined the profit is 8.65 per cent, as compared with 0.71 per cent in 1911.

A further list published by the Lancashire Shareholder's Association indicates that 153 companies, employing approximately £8,596,212 as share, loan, and mortgage capital, paid about 5¼ per cent on this combined capital. The 67 companies which issue balance-sheets earned 9¾ per cent on their gross capital.

A good deal of interest has been taken in the question of cloth contracts, especially in their relation to strikes and lock-outs, and at the beginning of December the Chamber of Commerce and the Cotton Spinners and Manufacturers' Association issued a circular in which they jointly recommended the insertion of a clause to give manufacturers some measure of protection from the penalties attached to non-delivery through *force majeure*. The question is complicated by the want of uniformity in the Eastern and other contract forms, and possibly some further development may occur during the coming year.

On the whole the working results of the great industrial concerns in which Lancashire takes particular interest have confirmed the estimates of general prosperity, though there was some disappointment with the balance sheet—issued in August—of the Calico Printers' Association, which nevertheless maintained its dividend at 3 3-4 per cent as in the previous year. The Bleachers' Association increased its dividend from 4½ to 5 per cent for the year ended March, and since then bleachers have been busy enough to assure a continuance of prosperity. Frequently during the year, and in some cases, persistently, the pressure on the bleachworks has been so great that merchants have not been able to obtain their goods in "reasonable" time, and this

delay in bleaching and finishing has now become a formidable consideration in the financing of stock. No doubt the Association is reluctant to extend works that might be considered sufficient for normal times, but a continuance of trade in its recent volume must make an effectual demand for increased accommodation either inside or outside the Association.

Egypt has received two visits from Lancashire deputations interested in the development of cotton-growing there. That from the British Cotton-growing Association early in the year took a particular interest in the possibilities of developments in the Sudan. The subsequent visit of the International Federation may fairly be regarded, too, as a useful stimulation to one of our greatest sources of supply. An event of considerable interest to the cotton trade is the Government grant of £500,000 for the development of East Africa and Uganda. The efforts to promote cotton supply under the auspices of the British Cotton-growing Association and the organizations for developing cotton-growing in German and French colonies are still active, and though they have not yet had a great effect on the world's supply there have been some encouraging developments.

In spite of the lock-out, the war, and other disadvantages, manufacturers generally have had an excellent year, and they have very good prospects of another. The home trade has been good, and most of the markets abroad have been very prosperous. India during the last twelve months has taken far more than its average or even its record consumption, and it has contracted ahead for supplies to an extent that may fairly be called unprecedented. Are they thus within measurable distance of a depression in the Lancashire trade, which depends so much on the Indian demand? It is impossible to answer this question unless by the platitude that in the cotton trade as in every other the periods of prosperity induce inflation, that depression follows, and that these are only incidents in the development of a great market. There is, as yet, no appearance of satiety, though the buying for India has naturally decreased.

The trade with China has been considerably less than that of 1911, but China is recovering from its long period of relative inanition. During most of the year the trading communities there have been tantalised by projected loans that were to oil the wheels of the commercial machine, but in spite of the disappointingly slow relief the conditions have continued to improve, and a good year's trade may be expected. Some good sales of staples have been made during the last few months, and there has now been a distinct improvement in the fancy trade, which is a valuable asset to Lancashire. Turkey, too, for obvious reasons, has been a disappointing market, and it is remarkable that the dislocations from the war have not been greater. Egypt is a spasmodic trader, and various circumstances have combined to make it only an indifferent customer this year. Exports to the Dutch East Indies are more than maintained at last year's high level; Japan on the evidence of the year, which cannot, of course, be trusted, appears as a dwindling market; Cuba has gone ahead remarkably; the South and Central American markets come out satisfactorily; and the Colonies have generally at least maintained their position.

There has been again a considerable shortage of weavers in Lancashire, and this may ultimately have some influence on the use of automatic machinery here; what we should suppose to be an innovation is the institution by a manufacturer of a weaving school at which the pupils were paid to learn their trade.

The strength of the yarn market during the year must be attributed in large measure to the excellent state of the export trade. Month after month the totals of the last year—which was a fairly good one—have been exceeded, and the home market here has been greatly relieved by the large and steady withdrawal of millions of pounds of yarn which in less happy circumstances might have been hawked about the Exchange. The near Continental countries have done well, and until the war came the Near Eastern markets had done exceptionally well. India, too, has been a good customer, though yarn buying recently has not held its own relatively with cloth buying for the Indian markets. The home trade, of course, has been remarkably good, and margins have been generally satisfactory without being exorbitant. Spinners have had great difficulty in obtaining good cotton, and it seems likely that their difficulty is to continue.

There has not been any conspiciously weak place in yarns, but lately the finer counts of American have been in strong demand, and perhaps ring beams have been generally stronger than twist cops. Good carded Egyptian yarns have done very well, but the lower grades of Egyptian are a little discredited, and have been to some extent supplanted by American. Extra hards were doing very well until the war broke out, since when there has been some accumulation of stocks and both stoppage and diversion of machinery. Doublers have had a good year, but recently demand has been mainly from the home trade, and the erection of a large doubling plant in Germany may tell appreciably against them. All things considered the year has been a remarkably good one, and with increasing looms and a position already strong the outlook is reassuring.

The growing of cotton in Imperial Valley, commenced in 1910, has proved successful. The returns, in bales of 500 pounds, are as follows: 1909-10, 300; 1910-11, 6,000; 1911-12, 9,500. The price in 1911 was 14 cents and for last year 9½ cents per pound. The soil is very rich, being a sedimentary deposit from the Colorado River. The product is nearly 1 bale per acre. At 9½ cents the net profit to the grower on land valued at $100 per acre is $15 per acre per annum, after allowing the farmer wages for his work. The Imperial Valley Oil & Cotton Co., of El Centro, handles most of the crop. It estimates the crop for 1912 at 20,000 bales.

In a recent report from Pernambuco, Brazil, Consul P. Merrill Griffith comments on the high cost of living in Pernambuco as compared with the cost in the United States. He says generally speaking the cost of living there is three times what it is here. In quoting the current market prices for some of the ordinary necessaries of life, he says that sugar costs 14 cents a pound, potatoes 10 cents a pound, rice 14 cents a pound, ham $1.50 a pound, bacon 63 cents a pound, while most drugs, toilet articles and groceries are sold for at least double the prices charged in the United States and the cost of clothing or any kind of wearing apparel is fully three times as great.

That man is best educated who is most useful.

HOW TO SAMPLE COAL.

BY E. G. BAILEY, MECHANICAL ENGINEER, FUEL TESTING CO., BOSTON, MASS.

SAMPLING AT MINES.

Samples of coal cut from the working face in a mine are of little value for determining the quality of coal shipped to market, due to failure on the part of the miner to eliminate all roof, floor, and parting slate, and impurities in the coal loaded, as is usually done in taking section samples. However, mine samples are of value in determining the character and approximate quality of coal from a new or idle property. They are also of value, when taken from strata of the seam separately, in locating the part of the seam which contains the higher or lower percentages of ash, sulphur, phosphorus, or clinker-forming impurities. If consistent with economical mining, parts of the seam may be left in, or gobbed, in order to produce a coal of desired purity to meet certain market demands.

Mine samples should be taken as a standard in representing the best coal that could possibly be produced with perfect preparation, and the quality of coal being shipped should be made to approach this standard as closely as is practicable.

In some mining districts the sulphur varies widely in different parts of a mine, and often certain headings will be found to produce coal low enough in sulphur to meet certain specifications while the average of the mine would be prohibited.

Very few coal operators open up a new property without first diamond-drilling it to learn the dip and uniformity of the seam. After expending so much money to obtain these cores, they should be analyzed and the quality of the coal from different parts of the field determined. It even pays to make a separate sample from each 6 to 12 inches of the core, whether divided according to natural partings or not.

The method of taking mine samples is to select or make a freshly-exposed full section of the seam and spread a canvas (4x6 feet) on the floor beneath it, then cut a channel about 4 inches wide and 4 inches deep from the bottom to the top of the seam, leaving any partings or streak of impurities which are to be discarded in mining. Care should be taken to see that all coal cut from the upper part of the seam falls onto the canvas, as it has a tendency to spread when it falls. It is also essential that the groove be uniform in size from top to bottom and not smaller where the coal is hardest and larger where it is softest. When the coal has well defined butts and faces it is easier to cut a uniform groove from the butts. After the sample has been dug from the seam it should be broken and reduced in accordance with the method described in the August, 1912, issue of COTTON, and placed in a hermetically sealed jar or can, if the actual moisture is desired, otherwise a coin sack will be more convenient. It is unnecessary to take a special moisture sample before crushing and mixing mine samples, provided the work is done immediately and before the sample is taken out of the damp atmosphere of the mine.

If detailed information of the quality of coal in different parts of a mine is desired, and the cost of having a large number of samples analyzed is not too great, such samples should be taken from every three of four working places. Where only a few samples can be analyzed it is not best to depend upon single sections for each sample, but three or more such grooves should be cut and the coal from them mixed as one sample to represent the heading or part of the mine from which they were taken.

It is frequently desired to know the quality of coal coming from different benches or strata of a seam, in which case the groove should be cut across such parts of the seam separately.

The comparison of the analyses of samples taken from mine cars with those taken from sections in the working places indicates the care used by the miners in cleaning the coal. A similar comparison between the results of mine car and railroad car samples shows the efficiency of the tipplemen and car trimmers with respect to preparation. Railroad car samples represent the quality of coal shipped to market, as well as a comparison of the different grades, where the coal is screened or washed.

Mine car samples should not be taken from the tops of loaded cars, as they are likely to be trimmed with lumps, thus preventing the sampler from securing a true proportion of the lumps and fine. There is also a chance of pieces of roof or draw slate having fallen onto the car, which might cause considerable error in a sample taken from the tops of the cars. It is better to take mine car samples from the open end of the car as it is being dumped, or from a chute as the coal passes. A large shovelful (15 to 20 pounds) should be taken from each mine car at the smaller mines up to every tenth or more cars at the larger producers, and the sample accumulated throughout at least one entire day's loading. It is often desired to know the quality of coal being loaded from different headings separately, which can readily be done by throwing the shovelfuls taken from different parts of the mine into different piles. Each individual sample should be about as large as if one large sample were taken from all mine cars as a whole. The total weight of sample taken in either case should be governed by the size and amount of impurities contained in the coal.

If there is any attempt made to throw out impurities as the car is being loaded, the samples representing the coal shipped should be taken from the railroad cars throughout their loading. Shovelfuls should be taken from the slanting surface just before a new mine car or basketful is dumped, and after the slate pickers have finished cleaning the one previously dumped. There is a tendency for the lumps and heavier impurities to go to the bottom of the slanting surface, hence shovelfuls should be taken systematically from various parts of this surface. The shovel should be pushed well into the coal in order to avoid getting only that on the surface from which the impurities have been picked. Occasionally it is desired to take such a sample from a single car, in which case it would be necessary to take several shovelfuls from each mine-carful dumped, but if a whole day's loading is to be represented, a shovelful need be taken from only every fifth, tenth, or whatever number of mine cars is necessary to secure the required total sample.

An operator often investigates the quality of coal actually being shipped to the market for the purpose of seeing whether or not the coal can meet certain specifications for ash, sulphur, or B. t. u., and if not, how much better preparation would be required to meet such specifications. Very valuable information is gained by taking duplicate samples from the cars and picking out all slate and sulphur from one and comparing the results with the regular representative sample. This will indicate what reduction can be made in the different impurities, and by weighing or

measuring the sample, and weighing and noting the size of impurities picked out, one can determine if this better preparation could best be accomplished through inside or tipple inspection, or whether a picker belt would be required. If a washery is being considered, laboratory washing tests can be made to determine the quality of washed coal and the loss resulting from washing to any desired quality.

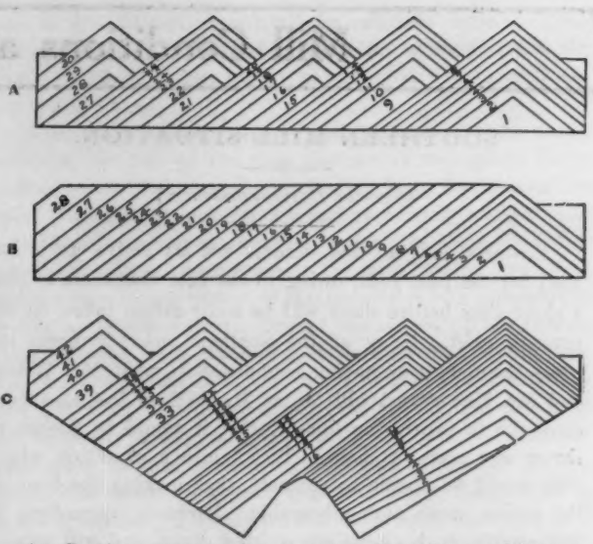
SAMPLING RAILROAD CARS.

There is great difficulty in obtaining a representative sample of coal from a railroad car that was loaded from individual mine cars, unless the coal can be sampled while it is being unloaded. The usual method of loading cars at the mines makes it almost impossible to obtain a sample from a loaded car which will contain a true proportion of whatever slate and impurities remained in the car. The slate and impurities are usually picked from the surface of a car as it is loading. Figure 1 represents some of the conditions frequently encountered; the areas containing numbers representing the quantity of coal from each mine car, and the numbers give the order in which the quantities were dumped. "A" represents a car that was moved to five different positions while it was being loaded. It is evident that any scheme of laying out points from which to take shovelfuls for a sample, or digging trenches, will not include any coal from several mine cars which lie near the bottom and will include an undue proportion of coal from the mine cars emptied on top. "B" illustrates a flat bottom car which was moved a short distance each time a mine car was dumped. When coal is loaded in this manner, the digging of a trench or holes should secure almost an equal proportion of sample from each mine car, but there is another error of even more importance that is likely to be greater from cars loaded in this manner than those like "A." This error is due to the tendency for the bone, slate and heavier impurities, as well as the lumps of coal, to roll toward the bottom of the car while it is being loaded. Some authorities, who have taken separate samples from the top and bottom of a car upon its arrival at destination, have claimed that the higher percentage of ash and sulphur found in the samples taken from the bottom of the car are due to the heavier impurities settling to the bottom during transit. While these impurities may tend to settle some in transit, the most plausible explanation of their being at the bottom of a car is found in the manner of loading the cars at the mines. Car "C," representing a steel hopper, illustrates the tendency for slate to slide to the bottom while being loaded, and the increased difficulty of obtaining a representative sample at destination without unloading the car.

If there is no alternative but to sample a loaded car, points should be located systematically on the surface and 10 to 15 holes dug at least 2 or 3 feet deep. The upright braces on the side of the car can conveniently be used as guides in locating the position of the holes according to some fixed system. Directions regarding the amount of sample to be taken and the method of its reduction, as given in the first article, should be followed.

If a sample is to be taken from a car being unloaded by hand, it is best for the sampler to have one shovelful out of every so many placed into the sample. As usually shoveled, there are about 125 to 150 shovelfuls per ton, and from the amount of coal in the car and the size of sample required, one can quickly estimate about how frequently a shovelful should be thrown into the sample.

If the car is unloaded through hopper bottoms to a pile, the sample should be taken as the coal is dropping out of the car, and if one car is to be sampled as an individual it may be necessary to retard the dumping in order to have enough time to accumulate a sample of sufficient size from all parts of the car. Coal should never be sampled from the pile if it is possible to do it otherwise.



A—Section representing car moved to five positions as loaded at the mines.

B—Section representing car moved a short distance at each mine car of coal was dumped.

C—Section representing steel hopper car moved to five position as loaded at the mine.

Figure 1.—Diagrams representing the distribution of coal as dumped from mine cars into railroad cars. Each area represents the quantity of coal from individual mine cars. The number represents the order in which the cars were dumped.

If a car is unloaded into a mechanical conveyor, either by hand or drop bottom, the sample should be taken from the conveyor as will be outlined in a later chapter. If a clamshell or grab bucket is used to take the coal from a car, the sample may be taken from the bucket itself or from the newly exposed surface in the car throughout the unloading, unless it is discharged into a mechanical conveyor or industrial railway from which the sample could be more easily taken.

A composite sample is often desired from several cars of coal loaded into or from a single vessel or else where shipped as a special consignment, in which case a proportional amount of the required sample should be taken from each car. In the case of coal shipped all rail to the consumer, it is best to sample a car individually, even if only a part of the total number of cars received can be tested. It is then possible to supply definite information regarding that particular shipment, while if a composite sample were made from two or more cars there could be no definite knowledge gained in case they were loaded at different mines.

"To be honest, to be kind. To earn a little and to spend a little less. To make, upon the whole, a family happier for his presence. To renounce when that shall be necessary, and not to be embittered. To keep a few friends, but these without capitulation—above all, on the same grim condition to keep friends with himself. Here is a task for all that a man has of fortitude and delicacy."—Robert Louis Stevenson.

Mill Conditions and Market Reviews.

SOUTHERN MILL SITUATION.

(Special Correspondence.)

Business just at this time is not as active as it has been for the past year, owing to the fact that there is only a short time before there will be some action taken on the present tariff. Many of the Southern manufacturers express themselves as having confidence in what Mr. Wilson and Mr. Underwood will do, as Mr. Wilson has been very emphatic in expressing himself that it would be foolish to throw any class of manufacturers into a condition where they would be unable to compete, thus making the laws of the nation harsh and unbearable. However, regardless of this confidence, business has quieted down, and will remain thus until after the extra session has taken what action it will in regard to a change in the provisions of Schedule I. It is not expected that if all of the provisions of the Underwood bill are passed, and it is very probable that almost the same bill will be presented now as that which was vetoed by President Taft, any great amount of harm will have been done the majority of the Southern manufacturers.

Another factor which has made itself felt in the placing of orders is the fact that the ginning reports have made a different showing than was expected by either side of the market. The last report showed a ginning up to Jan. 1st, of 12,919,257 bales, which averaging by the figures for the past several years, would seem to indicate a crop of something more than 14,000,000, considerably in excess of the Government estimate. The ginnings to date have been so heavy that the bulls are declaring that there is nothing more to gin, while the bears contend that this indicates a larger crop which will be substantiated by the last report which will be issued in March.

A call was issued by the Chairman of the Tariff Committee of the American Cotton Manufacturers' Association to meet at Washington two days before the hearing before the Committee for the Legislature on Schedule I, and that committee is now at Washington; but at this writing nothing of the action taken can be ascertained. It is expected, however, that those manufacturers who attended this meeting, and there were similar committees from other textile associations all over the United States, will have been armed with actual cost facts, and that they will be able to have some effect on the final drawing of the bill which will be presented to the Legislature for making into law.

North Carolina has been stirred for several weeks over the matter of proposed child labor legislation, at the present session of Legislature which is in session at Raleigh. The North Carolina Child Labor Committee has been active for the past two years and has gained for itself more than a common amount of outside interest among those who are not entirely familiar with cotton mill conditions in that state; and it is now endeavoring to pass laws which will not only be irksome to the manufacturers, but which at the same time will work a hardship on the many children who must of necessity find employment in the mills. The North Carolina Cotton Manufacturers' Association held a meeting at Charlotte on Dec. 31st at which time it went on record unanimously against any further legislation with regard to child labor in that state. However every manufacturer has not agreed with this Association, and there has been some sentiment and feeling displayed among the cotton mill men on this question.

Most of the mills are very well sold up, and are not actively in the market for orders. It is still a question of deliveries, though very few premiums are being offered. Buyers have paid high prices so long that they are now anxious to see lower, and with the slight reduction there has been lately in cotton, they want to place orders at lower figures, and in some cases are doing so. This has been more apparent in the yarn market than elsewhere, as yarns are now not so strong as cloth and knit goods. Spinners have been accumulating to a small extent and they have in some cases accepted lower prices to clear their stock, with the natural effect this has had on the market generally.

Knit goods continue the strongest in the textile field. Mills are sold through to Spring, and some of them are taking small orders on Fall requirements. There has been no concession in prices, though they have been able in some cases to purchase yarns cheaper.

The cloth market has not been a very active one, the greatest amount of trading taking place on brown cottons. No price concessions are being granted, and mills report to be well sold up.

Since our last letter there has been considerable activity in the mill building and improvement line; with a number of reports of new mill propositions. Summarized, the report of mill building, etc., in the South is as follows:

New Mills Proposed: A $300,000 mill is being organized at Mocksville, N. C., by local capital. Mayesville, N. C., has incorporated a company to build a $100,000 mill to be equipped with 5,000 spindles. The Crown Cotton Mills are interested in a plan whereby they will probably erect a new mill at Dalton, Ga. A new mill has been proposed for Claxton, or Hagan, Ga. The citizens of El Paso, Tex., are interested in organizing a $300,000 company to erect a cotton mill. Lydia Mfg. Co., has been incorporated at Lydia, N. C., at $30,000. Evansville Hosiery Mills, Evansville, Ind., incorporated at $10,000 to erect a knitting mill. Highland City Mills, High Point, N. C., have been organized and incorporated at $250,000 to build and operate a 10,000-spindle mill, which will be probably enlarged later. A knitting mill will probably be built at Cartersville, Ga. A new million-dollar company has been organized by the Erlangers at Lexington, N. C., which will probably be known as the Bel-Vi-Dere Mills, to be first equipped with 25,600 spindles and 700 looms, and later with 40,000 spindles and 1,000 looms. Interests are at work in organizing a new mill at Vernon, Tex. The Kearn Brothers, of High Point, have erected a building, purchased 100 knitting machines, and have started a knitting plant. A new mill has been mentioned for Kannapolis, N. C., also for Randleman, N. C.

Additions to Mills: Southern Mfg. Co., Oxford, Ala., are adding 1,000 spindles and 200 looms, at a cost of $4,000. Stevenson, (Ala.) Mills are adding to their building and installing humidifiers. Yocona Mills, Water Valley, Miss., are adding a dye and winder house. Docotah Mills, Lexington, N. C., are adding spinning frames and warpers, also

having new machine shop erected. Merrimack Mills, Huntsville, Ala., are adding a new warehouse, and will possibly later build another mill at that place. Monarch Mills, Dallas, N. C., are adding 60 x 75 foot addition and 4,000 twister spindles. Marion, (N. C.) Mfg. Co., are adding 300 looms, 25 cards, and a number of spinning spindles. Avondale Mills, Birmingham, Ala., have made an addition to power equipment. Alpine Mills, Morganton, N. C., are building a new warehouse. Unity Spinning Mills, LaGrange, Ga., is adding eight spinning frames. Daisy Hosiery Mills, Burlington, N. C., is adding a brick building, with equipment, etc. Adelaide Mills, Anniston, Ala., are adding 1,616 spindles. Anchor Mill, Huntsville, N. C., will add 5,000 spindles at once. Mills Mfg. Co., Greenville, S. C., will probably make considerable additions to their equipment. Social Circle (Ga.) Cotton Mills will add 140 looms. Riverside Mills, Augusta, Ga., will probably add a warehouse and machinery at a cost of $100,000. Riverdale Mills, Riverdale, Ala., are adding 5 new speeders. Fulton Bag & Cotton Mills, Atlanta, Ga., are adding humidifiers. Inman (S. C.) Mills will probably add automatic looms. Atherton Mills, Charlotte, N. C., are adding humidifiers. Keystone Finishing Works, of Burlington, N. C., have added a $5,000 building. Westervelt Mills, Greenville, S. C., have added a conditioning machine. Asheraft Mills, Florence, Ala., will probably make a large addition in the near future. Yazoo (Miss.) Yarn Mills are adding 1,500 spindles and accompanying machinery. Eureka Cotton Mills, Englewood, Tenn., are adding electrical machinery. Pioneer Cotton Mills, Guthrie, Okla., are adding drying machinery. Russell Mfg. Co., Alexander City, Ala., have contracted for 5,016 additional spindles. Tidewater Knitting Mills, Norfolk, Va., are adding 660 mule spindles, and also a warehouse 250x56 feet.

Changes and Reorganizations: International Mills, Baltimore, Md., are being completely reorganized. The Ide Cotton Mills, Jacksonville, Ala., are now known as the Profile Mills. The Broad River Mills, are the reorganization of the old Whittaker Mills, which were recently sold; the capital of the new company is $50,000. Anna Cotton Mills, Kings Mountain, N. C., have changed over from the production of sheetings and yarn to yarns only. Premier Mills have been moved from Barton to Helena, Ark. Oklahoma City (Okla.) Cotton Mills, will be reorganized by the Western Guaranty and Trust Co. Union Cotton Bagging Co., Norfolk, Va., has been petitioned for receivership, by minority stockholders. The Thos. F. Loyd Mills, Chapel Hill, N. C., have been purchased by J. L. Carr & Sons, of Durham, and will be reorganized as the Durham Hosiery Mills No. 7.

NEW ENGLAND MILL SITUATION.

(*Special Correspondence.*)

Trade has not been active with the mills for the past five or six weeks on staple lines of goods, such as brown and bleached cottons, prints, ginghams and fine dress cottons. In the past two weeks, however, business has been active on blankets and napped cottons for the fall season, and there has been renewed inquiry for other lines. The mills have good orders ahead still and are not troubled much by the absence of new business when all the circumstances are considered. An easing cotton market, a strike among the cutting trades in New York, and the renewal of tariff hearings at Washington, would each be sufficient cause for hesitation, and when is added to these an uncertainty in the money markets, it can hardly be expected that broad trading would go on.

Most manufacturers believe the fundamentals are sound and that the lull of the past few weeks will prove to be nothing more than seasonable after the large business of the fall. They do not look for a broad and rising market while a tariff reduction is in prospect, but at the same time they believe the actual requirements for merchandise are large and the purchasing power of the country is still unimpaired to any noticeable extent. One of the largest of the Boston factors in the trade believes that the first half of the year will be more or less fitful, but in the long run of months, he said last week, it will be found that distribution for 1913 will be pretty steady, and moderately profitable. There has been more or less price irregularity in cloths of various kinds, and there have been recurrent labor troubles of a minor character. The shortage of help noted last year is a factor of large import in manufacturing and it will continue to affect merchandising by restricting the output and delaying the delivery of goods due.

While print cloths have been declining in price to an average extent of 7½ per cent down from the top, prints have held their own and printed cambrics have been placed at value. Although the market on fine and fancy goods has been easy, there has been a distinct improvement in the demand for dress ginghams. Staple ginghams have been advanced ½-cent a yard to a basis of 6¾ cents for Amoskeags. Staple tickings have been advanced ¾-cent a yard to a basis of 13¾ cents for A. C. A. While fine carded cloths have declined a full ¼-cent a yard, last week the price of standard drills was advanced ¼-cent a yard to a basis of 8¼ cents.

The market has been full of just such contrary conditions and the underlying fact of great importance has been that goods have not accumulated and trade in retail or jobbing channels has not fallen off. The conservative tone to production is paralleled in the care used in mill agencies in accepting business that has any flavor of speculation in it. No one seems to lose sight of the possibility that merchandise values may have to be marked off when a new tariff bill is enacted. This was foreshadowed in the semi-annual report of the president of the H. B. Claflin Company two weeks ago, where it was openly stated that this large distributing concern had reserved a substantial part of earnings to be used for depreciation.

Throughout the large mill centers interest in the progress of the great strikes among garment workers in New York and elsewhere has been acute. The powers behind the strikers are the same ones that instigated the great strikes in New England mill centers a year ago. It is now noticed that the New York papers that were crying out against Lawrence manufacturers for the treatment of Ettor and his ilk, are now demanding legislation that will prevent talk of the Ettor brand being legal under the present day theories of freedom of speech. All of which is justifying the stand taken by the mills and their owners against that form of unionism that is modified anarchy and socialism.

Up to the middle of last week the effect of the strike was that several mills were compelled to withhold shipment of goods to cutters until the troubles clear up. The cutters have not asked to have goods cancelled, and cancellations will not be accepted unless confession of inability to pay is made. It is thought at this writing that some form of com-

promise will be reached before the end of the month in those lines where cotton goods are used most largely, but it may be some time before the clothing manufacturers' troubles are ended. Cotton linings and shrunks will be affected while those troubles are on.

Print cloths declined in price during the past four to six weeks from the top of 5½ cents for 38½-inch 64 x 60s to 5⅛ cents bid and declined. Sales have been made at 5¼ cents. Regular print cloths have dropped to 4 cents from the top of 4⅛ cents. Fall River mills are still running short to an extent of 70,000 pieces a week, full product being impossible with the limited list of employees. The mills are about 50 per cent sold ahead through February. The stock of print cloths on hand at Fall River is about 550,000 pieces, or hardly two weeks' output.

Staple prints are very quiet in the narrow lines. Some export business is being done and deliveries are being made on all orders and no accumulations of prints are reported. The business on percale has been steady, but deliveries to New York cutters were held up for two weeks and have only recently been cleared up by a settlement of the labor troubles with wrapper makers.

Bleached goods are on a basis of 8⅝ cents for 4-4 Fruit of the Loom, which is as high as any price reached last year. Deliveries of goods due are wanted by the jobbers, but there is no anticipation of future wants going on and the disposition of jobbers is to order additional goods from week to week. While many other kinds of goods were held back in delivery by the strikers, bleached fabrics were not seriously troubled.

The opening of the blanket season was followed by prompt confirmation of orders placed in December subject to the opening price being satisfactory. The list prices of the Nashua lines of blankets showed advances varying from 7½ to 10 per cent above the prices of a year ago. This was substantially the basis of the prices made by the Tremont & Suffolk. The Nashua and Esmond lines of fancy blankets were the largest ever shown and these goods were snapped up quicker than the plain goods. Some of the new jacquard cotton blankets are superior in every way to anything previously shown in this country. The leading blanket mills are sold up for the season. Some would not go beynod September, and others tried to limit business to August.

Flannelettes and domets were opened on the 20th inst. by the Amoskeag Company. The trade had been waiting for this action. The new prices on Amoskeags were on a basis of ¾-cent a yard above the opening prices of 1912 for plain goods, and 1 cent a yard higher on fancies, except Teazle downs, which were advanced only ¾-cent. These figures were higher than a year ago, but not higher than prices paid for flannelettes delivered by this company after October. The 1912 cloths made by the Amoskeag, is priced at 8½ cents, as against 7½ cents at the opening a year ago. Southern flannelettes were advanced from ½-cent to ⅝-cent a yard on the plain goods, and ¾-cent a yard on the fancies. At this writing (22nd), it is the belief of manufacturers that they will sell up every napped fabric they can make through the balance of the cotton year and at the advances asked.

The advance of ¼-cent a yard on standard drills was made because of the pressure for more goods for India shipment. The Pepperell Mills sold 32,000 bales of these drills to India last year, and the mills are stated to be under order till May 1. The new business at the higher price will take care of half of the May and June output.

The fine combed yarn goods business has been very light for some weeks past. Reorders have come in for novelty goods in fair volume, but there has been great disappointment in the volume of business for delivery after February 1. Voiles in the gray have been very weak and lawns have dropped ¼-cent a yard from the recent top. There has been a fair business on piques and novelty ratines, but these goods are not sufficiently in demand to furnish a volume business for the looms. Fine crepes have sold well recently. The feeling of anxiety among fine goods manufacturers has been acute this month, and many of them are in Washington at this time, getting their cases before the Ways and Means Committee. One of the most significant things is that many of the manufacturers who have gone to Washington did not take an active part in the Arkwright club meetings or in any other association meetings, but have been known as very successful manufacturers.

Among the machinery manufacturers there is anxiety as to the course of the tariff committees, and it is a saying among them that no one can predict what will happen. At the present time there is a fair business on the books, but few investors are anticipating on textiles and it can hardly be expected that trade will broaden until the tariff matter is finally settled.

The bleacheries have been running in full on orders that are now being completed. The finishers have been very active on novelty work, but there has been a dearth of business on many of the plain fabrics. The dyers have found work more plentiful than the white goods factors.

The New England Cotton Yarn Company is to cancel its lease to the Union Knitting Mills, of New York State, the bargain of three years ago not having proved profitable to the knit goods concern. The underwear and hosiery mills are very busy, and the yarn mills are having the most prosperous period for years past.

COTTON CROP CONDITIONS AND A REVIEW OF THE MARKET.

(*Contributed Exclusively to* COTTON)

BY H. AND B. BEER, NEW ORLEANS.

The caution that was advised on the long side of the market one month ago, when values were dangerously high, was timely and adhered to by many in the trade, for while there occurred a further improvement shortly thereafter, owing to the government's crop estimate, 13,820,000 bales, values have experienced a sharp decline of late, due to the realizations that the Bureau underestimated the crop by a big margin; present indications pointing to a commercial crop of about 15,000,000 bales.

The United States Census Bureau, in report of January 9, showed that 12,919,000 bales were ginned to January 1, against 14,317,000 to the corresponding date one year ago when the commercial crop was 16,138,000 bales. After January 1 of last year, 1,821,000 bales were accounted for. On the basis of 500 pounds gross weight, on which basis the government's estimate was based, the states of Alabama, Georgia, South Carolina and North Carolina have already ginned as much or more cotton than the Bureau estimated for the whole season, while Texas, which looks good for 5,000,000 bales, and the other states are not far behind. The following is the ginning by states to January 1, compared with the government estimate for the whole season, linters, etc., not included: Alabama, 1,290,000 vs. 1,330,000; Arkansas, 732,000 vs. 854,000; Florida, 56,000 vs. 68,000; Georgia,

1,767,000 vs. 1,701,000; Louisiana, 367,000 vs. 435,000; Mississippi, 937,000 vs. 1,109,000; North Carolina, 857,000 vs. 878,000; Oklahoma, 846,000 vs. 1,039,000; South Carolina, 1,174,000 vs. 1,184,000; Tennessee, 249,000 vs. 280,000; Texas, 4,462,000 vs. 4,850,000; all other states 82,000 vs. 92,000.

With the opening of the new year there has been a marked falling off in the export demand. In the middle of December exports to Europe were 380,000 bales larger than to the same date last year, today they are 171,000 bales smaller than last year, having lost 557,000 bales during the past four months, when compared with one year ago. Shipments to Europe continued heavy during the whole of last season, having been especially heavy last January, February and March, but will probably be much smaller this year.

As a result of the want of an urgent export demand from Europe, receipts, which, however, are expected to fall off sharply owing to the rapidity with which this crop was marketed, have been rather light of late. But this feature has prevented stocks at the 30 counted interior towns from decreasing the past week. As a matter of fact they show a gain of 1,000 bales, against a decrease for the corresponding week of last year of 55,000 bales. It is probable, therefore, that unless the demand from Europe improves, stocks will not lose any faster than after this time one year ago.

Up to date 10,045,000 bales of the American crop have been marketed compared with 10,288,000 bales to the corresponding date one year ago, when the crop was over 16,000,000 bales, which, therefore, is a very good showing, and is another indication that the crop has been underestimated. Asia has large crops of cotton this year. To date receipts at Alexandria, Egypt, total 6,177,000 cantars, against 4,806,000 to even date last season, while arrivals at Bombay, India, where the crop was late, total 658,000 bales, against 566,000 bales last year.

Spinners takings of American cotton thus far this season total 6,388,000 bales, compared with 6,211,000 to this date one year ago, which is remarkably large considering the fact that last season's takings of American cotton by the world were 15,585,000 bales. But the greater part of these acceptances represent old business, cotton contracted for when the market was much lower than it is today. It is probable, therefore, that mill takings by the world in the future will be much smaller than after this date last season. This is already indicated by the big falling off in exports to Europe of late.

The world's visible supply continues of record-breaking proportions for this time of the season, being as follows:

	This Year	Last Year
World's visible supply of American	5,009,000	4,887,000
World's visible supply, other kinds	1,242,000	821,000
Total world's visible, all kinds	6,251,000	5,708,000
Middling, New Orleans, today	12¾cts	9⅝cts.

THE KNIT GOODS MARKET.

The knit goods market for the past month, while set an excellent example by the earlier weeks in December, dwindled off for the holiday season and up to the present has remained comparatively quiet, awaiting the action of the knit goods buyers who had a meeting at the Waldorf-Astoria during the middle of January. The uneasy position of the cotton market is probably a large factor in determining the buyers to hold off temporarily. However, the squeeze in January may have a tendency to induce further offers on their part.

While the middle of December found jobbers buying freely on fall 1913 underwear and what was believed to be the heaviest demand in the knit goods trade in many seasons having been in evidence for several weeks prior to this time, the approach of the holiday season gradually cut off the business, while the stock taking time of the first of the year assisted materially in upholding that cut-off. Union suits made gains in the underwear trade and orders were not worrying many manufacturers as much as where they could cover their needs in the raw material at fair profit. The tariff created little interest at this time and many salesmen report that they heard nothing of it on their selling trips during the holidays. Some buyers have complained that prices on cotton underwear were decidedly stiff while others seem to be of the opinion that the opening prices would be the lowest seen during the entire fall season of 1913. Men's cotton ribbed goods opened at $3.12½ a dozen one year ago, while the opening season of 1913 was on an average of $3.62½ a dozen. However, the raw material one year ago was selling on a basis of 8 cents per pound while this year it is around 12 to 13 cents. Union suits sold freely for next fall and many mills are in a position where they do not care to accept further orders. Sales of fleeces were also good and as the production of these in the United States is somewhat limited, it was rumored that late buyers would probably have considerable trouble in getting the deliveries they desired. In the hosiery end of the market prices were very firmly fixed with buyers paying advances on goods for fall of 1913 without much protest. On fleece lined hosiery many complaints were made by buyers regarding late deliveries and some of the mills were reported to be anywhere from six weeks to two months behind on orders for the current heavy weight season. Silk hosiery sold in large volumes and most of the mills have orders on their books sufficient to run them to the fall of next year.

January found the hosiery market expectant and the time for the annual influx of buyers about to arrive caused considerable strengthening in the general conditions. While knit goods lines were very quiet as stated above, partly because of holiday conditions and stock taking and partly because of expectant changes in the raw cotton market, affairs moved along in a manner characteristic of the period following the initial business. The bulk of the orders were expected to be given by the buyers on their arrival and under conditions prevailing in the cotton market at that time it was believed that the business already placed would hold.

At the time of writing buyers from all sections of the country are in the market and will probably cover all needs for the spring and fall seasons and attend the annual convention of wholesale buyers at the same time. The jobbers' association held its annual meeting and the annual banquet of the association was held at the Waldorf-Astoria. Selling agents report that they are well satisfied with what has already been accomplished on their line and that orders on their books are well ahead of those for the same period last year. Buyers who have been operating in the market for the past few days have shown more interest in further supplies of light weight goods than in fall lines. Most retailers and jobbers wound up the old year with very small stocks on their hands and the unusually mild winter up to date has resulted in the still further depletion of stocks. Manufacturers of heavyweight underwear are taking about all the orders they care to for the present, and in many

cases have completely withdrawn from the market. Meetings were held during the past few days by members of the underwear trade to discuss the tariff question. In the hosiery division of the market the demand has accounted for a large part of the output and most of the mills are now in a comfortable position for the spring and fall season. Seamless cotton hose showed comparatively little activity, but the prior purchases have been provisioned to meet all demand. As soon as the cotton market becomes settled and knit goods manufacturers are certain that there is comparatively little prospects of a lowering in the yarn market section, business in the knit goods line will probably take another spurt.

THE YARN MARKET.

The yarn market for the past month might be characterized as a waiting market. The holiday season and stock taking prevented any activity in the early weeks and most of the knitters believing that prices will ultimately decline, steadfastly refused during the latter weeks of the month to cover their needs to any large extent. They bought merely in a hand to mouth fashion and just sufficient to keep the immediate orders disposed of.

The middle of December showed neither division of the yarn market very active although there was a moderate volume of business for quick delivery. Deliveries on old contracts were good and many manufacturers were pressing dealers to make deliveries on yarns bought at a few cents a pound under the prices then prevailing. The demand for combed yarns was light at this time, but mercerized yarns were held at very high prices. Sales of 60's two ply combed peelers were made for 58 and 59 cents for eastern yarns and 60 cents for Southern yarns. 40's two ply combed peeler sold for 44 cents and 36's two ply from 41 to 42 cents. Sales of Southern frame spun combed peeler was made on a basis of 26 cents for 10's. Weavers were buying from hand to mouth at this time as they believed that prices were at the top, although spinners showed no signs of letting down the bars.

As the year closed the prevailing high prices were working some changes in the yarn market. For some time the demand for eastern spun combed yarn was comparatively small, while the demand for Southern frame spun combed was considerably in excess of normal. There is now a gradual change in this however, with a noticeable increase in the demand for the eastern spun combed. Although the demand for combed yarns at this time was very light because of the holiday season, the prices held very firm. Fine two ply combed yarns continued to be hard to get for quick delivery. It was reported that many mills were in need of supplies, but buyers had been very confident that the raw material market would go lower they were not quite so certain at this time.

The middle of January showed continued light trading in the Boston yarn market with small quantities of spot yarns chiefly called for. Combed yarns continued in light demand as it was believed that the prices were so high that the manufacturers could not afford to buy freely. Many dealers believed that it would be impossible for spinners to hold to the prevailing prices and it was only a question of time until the prices would be lowered.

At the time of writing underwear manufacturers are buying in comparatively small quantities for heavyweights for May delivery on the basis of 21 to 21½ cents for 10's. The demand for combed yarns continued very light. High grade eastern 80's two ply combed peeler is being offered for prompt shipment at 78 cents whereas two weeks ago the same spinners were asking 80 and 81 cents. Other eastern combed mills are probably getting short on orders as is indicated by this slackening in the price of eastern yarns. Weavers are buying from hand to mouth, although there was two or three sales of 25,000 pounds by large users. A noticeable feature of the business during the past tw weeks was the falling off of the demand for the finer numbers. There is very little demand for 24's two ply and 26's two ply warps. Yarn buyers seem to be waiting for prices to drop to a lower level and spinners are waiting for buyers to place contracts. One dealer indicated his belief that even under the most favorable circumstances it was not probable that 30's two ply would sell above 30 cents and other numbers at corresponding prices. Spinners who are sold up for some time ahead want a premium on yarns for quick deliveries and are asking 25 to 25½ cents for 20's two ply warps, 29½ cents for 30's two ply, etc. The cotton market is very uncertain and has been so for several days, but it is impossible to predict with any degree of accuracy what the future will bring forth in this line.

The following are recent quotations in the Philadelphia market:

Southern Single Skeins.

4s to 8s	20 @20½	16s	22½
10s	20½@21	20s	23 @23½
12s	21 @21½	26s	25 @25½
14s	22	30s	28 @28½

Southern Two-Ply Skeins.

8s	21	24s	25½
10s	21½@22	26s	26 @26½
12s	21½@22	30s	28½
14s	21½@22½	40s	38 @38½
16s	22 @22½	50s	45
20s	24	60s	50

Carpet and Upholstery Yarns in Skeins.

8-4	20 @20½	9-4 slack	20½
8-4 slack	20½	8-3 hard twist	19 @19½

Southen Single Warps.

8s	21	20s	23 @23½
10s	21 @21½	24s	24½
12s	21½	26s	25 @25½
14s	21½@22	30s	28 @28½
16s	22½	40s	36 @37

Southern Two-Ply Warps.

8s	21	24s	25½@26
10s	21½	26s	26 @26½
12s	22	30s	29
14s	22½	40s	38½@39
16s	23 @23½	50s	45 @46
20s	24 @24½		

Northern Two-Ply Carded Peeler Skeins.

20s	26½	36s	35 @36
22s	27	40s	40
24s	27½	50s	47 @48
26s	28 @28½	60s	50 @51
30s	30 @31		

Two-Ply Combed Peeler Skeins.

20s	31 @32	50s	48 @50
24s	33	60s	57 @60
30s	36 @37	70s	69 @71
40s	45 @46	80s	78 @80

Single Combed Peeler Skeins.

10s	29½@30	40s	41
24s	31	50s	47 @50
30s	34 @35	60s	57 @59

Southern Frame Spun Yarn on Cones.

8s	20½@21	20s	23½
10s	21 @21½	22s	23½@24
12s	21½@22	24s	24
14s	22 @22½	26s	24½@25
16s	22½@23	30s	26 @26½
18s	23 @23½		

The world's estimated production of commercial cotton from the crop of 1911 is 22,297,000 bales of 500 pounds net; the estimated consumption for the year ending August 31, 1912, is 20,402,000 bales of 500 pounds net; and the estimated number of active consuming-cotton spindles is 140,996,000.

The greatest mistake a man can make is to avoid action for fear of making a mistake.

COTTON MANUFACTURING.

CAUSE OF DEFECTIVE YARN AND ROVING

(*Contributed Exclusively to* COTTON)

BY WILLIAM SHAW.

Much has been said and written upon the above subject, which is a most potent factor in the production of good yarn and cloth. Many writers lay the cause to the derangement of the machines or their parts, while others claim that is is due to the persons in charge of the machines in not thoroughly understanding the working parts, especially the winding on motion on the fly frames, which is called a problem by many writers to this day.

The object of this article is to attempt to clarify some matters relating to this imperfectly understood subject, and show that it is not a problem at all to any thoughtful and ambitious carder. In the first place what causes a certain amount of pull on some of the strands of cotton during its passage from the front roll to the bobbin, while on others the tension is perfect throughout the set? Even if every strand of cotton passing from the front roll to the bobbins had the same diameter throughout its length, conditions are sometimes found to exist on the latest fly frames to make the tension uneven on some of the bobbins, which is the reason why in some mills uneven yarn is found much more than in others. Some mills have no special system of oiling top rolls, which is one of the greatest causes for this pull found to exist on some of the ends during the building of a set of roving.

Consider what takes place between the front steel and top leather rolls when the top roll is dry or dirty. Every mill man knows that all leather top rolls are driven by frictional contact, if the top roll is not free to revolve as it should, the surface speed is reduced and the strand is of course shortened, which destroys the relationship of the surface speed of the front roll and bobbin. Again, if the flutes on front rolls that have run for some time be examined, it will be found that the side of the flutes opposite to the running direction of the roll are very sharp and that any increased or unnecessary friction will occasion these sharp flutes to roughen the smooth leather covering, thus gradually destroying the front top rolls. The above can be noticed more in the ring spinning where the end has a tendency to lick up and in most cases form a roller lap.

Every person in charge of either carding or spinning should understand that all front top rolls have enough to do without any unnecessary friction, even though the draft on the frame be very short. Some seem to think that because a short draft exists on either fly or ring frame that little attention should be paid to the front top rolls, as they point out that the rolls have little to do. However, the harm is the same when top rolls are neglected, whether the draft is long or short on fly frames. All practical carders will admit that a dry roll will in some extreme cases cause the pull to be so great as to cause the layers of roving to be wound close together, making the bobbin of roving as hard as a rock. The above should be enough to convince any person in charge of either fly or ring frames that neglecting top rolls is one, if not the greatest evils to be found in a cotton mill. The writer has seen rolls in such a condition that if the grade of cotton was changed to one slightly more wiry, hard ends and cockled yarn could be found all over the mill.

Some writers tell us that the pull on the strand from the front roll to the bobbin is due to the fact that the bobbin barrel is made to revolve at a speed greater than the speed of the flyer through which the strand of cotton passes on its way to the bobbin. The above is true in some cases, but much is written by men that have done very little laboring inside a cotton mill, and lack practical knowledge. It must be admitted that even if the excess surface speed on a bobbin lead frame was equal to the excess surface speed of the front roll, that a pull would exist on every end where a dry or dirty roll was found.

Builders are doing their part in turning out machinery at the present time, for it must be admitted that any up-to-date mill filled with the latest machinery can manufacture at a much lower cost than one filled with old machinery. But even with new machinery, if those in charge do not understand or neglect the working parts, in such cases profit is often turned into a loss.

I shall endeavor to show, (1) what relation should exist between the speed of the front roll and the speed of the bobbin; (2) why it is impossible with our present system of carding to hold this relation throughout the set; and, (3) how mathematical calculations by the builders are destroyed.

On all bobbin-lead frames, the surface speed of the front roll and the excess surface speed of the bobbin over the flyer should be equal. The above has been the almost universally accepted theory for many years. Some writers would have us believe that the above theory was accepted, because on the flyer lead frame, owing to the flyer starting in advance of the bobbin, a weak place was caused in the roving, but this is not true. The reason the bobbin-lead frame is accepted is because in a flyer-lead frame, owing to the flyer rotating at a speed greater than that of the bobbin, the bobbin must have its slowest speed when empty and its greatest speed when filled, and must constantly and uniformly increase in the number of revolutions during the entire building of the set between two extremes.

The amount of cotton added on all the bobbins should be considered. For instance, on a fly-frame $7 \times 3\frac{1}{2}$ a filled bobbin weighs about 11 ounces, so if a speeder contains 176 spindles, we have $11 \times 176 = 1936$ ounces, or about 140 pounds of cotton on the bobbins. The increasing speed and weight of the bobbin are the principal objection to a flyer-lead frame, as the larger and heavier the bobbin becomes, the faster they must be driven, hence the greater amount of power required to drive the bobbins at the end of the set, thus increasing the slippage of the cone belt. That is the reason why on all flyer-lead frames, the ends slacken when the frame is started when the set is nearly filled. As regards the flyer-lead frame making weak places in the roving, it must be said that a flyer-lead frame and a bobbin-lead frame are the same, and will not make weak places in the roving, unless the wrong tension gear is on the frame, so that it will increase the tension, or if the rack is shifted towards the starting point of the cones.

Examine a flyer-lead frame and you will find the compound pinion on the side of the periphery that drives it in the same direction as that of the driving shaft. It can be

seen that as the cone belt is on the small end of the bottom cone and on the large end of the top cone at the beginning of the set, that the high speed of the bottom cone reduces the speed of the bobbins, while on the bobbin-lead frame the compound pinion is found on the side of the periphery that drives it in the opposite direction of the driving shaft.

It may be deduced from the above that the slippage of the cone belt in each case will slacken the ends, because when you raise the bottom cone on a flyer-lead frame the speed of the bobbin is increased to the same rate of speed to that of the flyer while on the bobbin-lead, when the bottom cone is raised the excess is destroyed and the bobbin speed decreased to the same rate as that of the flyer. In other words, in order to wind ten inches of roving on the bobbin in case of a flyer-lead frame, the eye of the presser on the flyer must move just ten inches farther than a point on the surface of the bobbin during the length of time that it takes for the drawing rolls to deliver ten inches of roving on the bobbin, a point on the bobbin must move just ten inches farther than the eye of the flyer presser during the length of time that it takes for the drawing rolls to deliver ten inches of roving. It should be understood that this lead of the bobbin over the flyer is independent of the actual speed or velocity of the bobbin and flyer, both of which are of course rotating in the same direction on both the bobbin-lead and the flyer-lead frames.

It appears to be a most curious thing that the lower cone always diminishes in speed as the bobbin increases in diameter, whether the frame be a flyer-lead or bobbin-lead. It is the direction of the periphery that seems to puzzle many, as they fail to see how the high speed of the bottom cone in case the flyer-lead decreases the speed of the bobbin while the high speed of the bottom cone in case the bobbin-lead frame increases the speed of the bobbins.

However, if what is said above be carefully followed and the position of the compound pinion, together with the rotating direction of the periphery be considered, it will be plain that in a flyer-lead frame, the cones actually take revolutions from the bobbins, and the faster the bottom cone revolves the slower must the bobbins revolve, because for every single revolution given to the periphery two revolutions are taken from the driving shaft. In the case of the bobbin-lead owing to the periphery being made to revolve in the opposite direction to that of the driving shaft, for every single revolution of the periphery two revolutions are added to the differential sleeve. The above refers to the Holdworth's motion.

Next, why is it sometimes impossible with our present system of carding to hold the above relation throughout the set? Cones may be figured out theoretically correct with the bobbin and the spindle traveling together, aside from the motion of the periphery or sun wheel, but there are many things that will offset this perfect figuring so as to oblige the cones to be modified thereafter.

Let us now consider a few things that will change the outlines of the cones in order to keep the tension perfect:

(1) There is the slippage of the cone belt.

(2) The width of the cone belt plays an important part; the narrower it is, the more benefit is obtained from the perfect outlines of the cones.

(3) The difference in tension between the empty and full bobbin due to the slight variation in the pressure of the paddle on the bobbin.

It is safe to say that the above is little understood in most mills, and it must be admitted that careless flyer fixing is another cause for uneven roving and yarn.

The functions of the flyer from the beginning to the end of the set is perhaps not fully understood by those who have charge of the machines. When a set is started the paddle of the presser should bear on the surface of the bobbin, and the presser rod attached to the hollow leg of the flyer should then be at its farthest outward swing. When the bobbin is full the presser rod is found behind the hollow leg of the flyer with the pad still on the surface of the bobbin, but with more pressure, because it may be seen that the position of the presser rod at the ending of the set will increase the pressure of the paddle on the surface of the bobbin. The reason for this is clear, because owing to the presser rod having its largest swing at the start of the set the air current reduces the pressure on the paddle to some extent, as the bobbin fills and the presser rod is gradually moved towards the rear of the hollow leg, it passes out of the influence of the air currents and the pressure is slightly increased. So when a flyer is repaired, the person doing the work should have in mind that the presser rod should be attached or positioned on the hollow leg of the flyer, so that the presser rod will have its outward swing when the paddle touches the surface of the bobbin, and be directly at the rear of the hollow leg when the paddle is gauged to the same distance from the surface of the full bobbin. The best and surest way is to use a full bobbin of a proper diameter when repairing flyers, or have a wooden gauge made exactly the shape of a filled bobbin.

If all presser rods are not positioned exactly alike, bobbins of different diameters will be formed, that is, on all bobbins where the presser rods do not have their outward swing, the bobbins will be slightly more compact, while on those that the presser rod passes the point of the outward swing the pressure of the paddle will be slightly reduced, and this will allow the bobbin to increase in diameter, which will of course strain the ends. This will occur in each case whether or not the strand is perfectly even throughout its length. The presser rod is controlled by the speed of the frame, that is, if in a proper condition. Therefore, if the presser rods do not occupy the same position, a different pressure will exist on different bobbins, and although the claim is made by many that this difference of pressure is slight, nevertheless it is enough to destroy the relationship of the surface speed of the front roll and bobbin, and the result is slack ends here and there, while on others the strands are strained.

If the reader has an opportunity to watch any fly frame after reading this article, let him stand at the end of the frame and watch how the ends here and there have a different tension. Of course, a different tension is always found at the start of a set, due to the bobbins varying slightly in diameter, but this is not what the writer is aiming at. Examine the frame when partly filled, say from a quarter full to the ending of the set. Here is another proof that will show how either the flyers or top rolls will effect the strand. Remove a flyer from the frame when the set is about one-half full, and fit the presser rod to the hollow leg of the flyer so that it will not have the freedom to swing that it should, then replace on the frame and watch it run for a few minutes, and it will be noticed in a short time that this particular end will become strained or broken. The cause is simple, when you fit a presser rod too closely to the hollow leg, the presser rod is then unable to respond

to the speed of the frame, and the pressure on the paddle is reduced. Still there are many "fixers" to this day that conceive the idea that a close fitted presser rod increases the pressure of the paddle.

Next, oil all top rolls during the set, say when about one-half full, and it will be found in the majority of cases that the frame will run badly thereafter until the ending of the set, slack ends being the cause here and there along the frame. This is the reason why shell rolls were discarded, because the large bearing of the front roll on the arbor caused so much friction that when the top rolls became slightly dry the work became deplorable throughout the room.

To further prove what was said above regarding the flyers, one needs but to study the principle of one make. On this flyer we find that the top of the presser rod is heavily weighted and free to swing so that the same pressure is maintained on the paddle throughout the set by the speed of the frame. It is at no time during the building of the set under the influence of air currents. This is why one flyer can wind in some cases one-third more roving on a bobbin, simply because the pressure of the paddle is increased by the weighted presser rod and besides the pressure is the same throughout the set.

As before stated, the flyer is the most misunderstood piece of machinery in a mill. Visit some mills and it may be seen where the carders have the flyers positioned so that when the frame is stopped the presser rods will all be on the outside and all meet on the inside between the spindles. They claim that this balances the frame and prevents any vibration to the spindles and rail. This is a very wrong idea, and besides being very injurious to the flyers, on narrow gauged frames it makes it more difficult for the speeder tender to piece more than one broken end on both rows of spindles.

Flyers should be positioned so that the presser rods in each row of spindles will be nearest the roller beam when the frame is stopped. In this way the tender can piece ends on both rows of flyers more quickly and easily. If flyers are positioned as in the first case, if the frame be one of a narrow gauge, the presser rods will often strike together and in some cases be detached and fall among other revolving flyers, thus not only injuring those that have come in contact, but also others.

Flyers are balanced separately, and their position on the spindles does not effect the running of the spindle or frame, or cause any undue vibration. When spindles and rail are found vibrating the trouble is in the frame being out of alignment.

If the reader has charge of fly frames, he will find the above points very valuable in making a more even roving, because the following proofs should make it clear enough that what is said above will effect the tension and make either slack ends or strained roving. The first proof should be made in case of the flyer, by studying the principles of them. When this is done, the reader will arrive at the conclusion that the air currents does effect the pressure of the paddle on the surface of the bobbin with some flyers owing to the increasing diameter of the bobbin gradually working the presser rod towards the rear of the hollow leg of the flyer, thus bringing the presser rod more out of the influence of air currents which increases the pressure of the paddle on the surface of the bobbin.

Next, to prove how a dry or dirty roll will cause strained roving, remove a couple of layers from a bobbin, and then piece up again and start the frame, and when the end begins to run slack, (as it surely will owing to the bobbin in question having a smaller diameter), just press the thumb slightly upon the top leather roll of the end in question and it will be found possible to run this bobbin of a different diameter. Let the reader make the above test, and if the frame on which the test is made be equipped with solid top leather rolls, let him ask himself why the end or ends drawn by the same front roll do not break, except of course in case the pressure on the roll is too great and cause too much retardation. Every practical man will at once see the writer's point, that is, you can run a bobbin a couple of layers smaller by pressing slightly on the top roll without breaking the end or ends drawn by this same roll.

The above is often done by speeder tenders in every mill. But let us stop here and consider what we are letting go on in our mills when we allow this practice to continue. No one can deny by the above practice that an end will run even if the top roll does retard; there can be no argument upon that point. So, then, every time that a speeder tender is allowed to retard the top roll to run a smaller diameter bobbin until the frame has run a layer or two and the diameter of the bobbin has become more equalized to the rest on the frame, the ends operated by the same roll are surely strained. What is the result? The ends referred to above from either holding or pressing the thumb against the front roll, or from dry or dirty rolls, are the ends that are causing the most trouble in later processes.

Let there be no misunderstanding about what is meant. When one presses the thumb against a front top roll to increase the tension on the end running slack, it strains the end or ends operated by this same roll.

If the second roll is dry, the end will be uneven in places and cause the same amount of breakage at the warper and loom.

When the front rolls are dirty or dry the roll does not have the freedom to draw the fiber from the second roll regularly, and the strand is shortened and made much heavier, and the diameter of the bobbin is reduced owing to the pull. A bobbin in the above state will run and make heavy work. In some cases it will cause hard ends in the spinning room that will in turn whip down one or a dozen more. But it is not strange, when one stops to think of it, how it is that we find on our warpers today ends continuously breaking. In fact, it is very seldom one will find all warpers running at the same time in any mill fine or coarse. Why those weak ends? Why give so much attention to only the front rolls when we know that a dry second top roll is more injurious to either warping or weaving than a dry front roll? Why allow a speeded tender to hold her or his thumb on a front roll to remedy one bobbin on a speeder instead of breaking it back and strain other ends that will necessitate the stopping of hundreds of ends at the warper and loom for each of those ends?

No practical mill man will deny that in our cotton mills the yarn varies a great deal more than it should, and in most cases it will be found that the trouble is on the fly frames. To have the surface speed of the front roll and the surface speed of the bobbin equal at all times during the building of a set of roving is a very difficult thing to do. To prove the above, size a full roving and then size the same roving when nearly empty, and it will be found to be heavier at the finish of the bobbin. Why is this so? Why are not the coils of roving the same weight throughout the set? Such a condition cannot be laid to the un-

evenness of the roving from ordinary causes as it is just as liable to be light at the beginning of the set.

The reason why the last coils or layers of roving are lighter is because that on the first layers the true mathematical computation can be attained, but as the bobbins fill the increasing pressure of the paddle on the bobbin gives more aid to the cone belt, and this slight difference is enough to strain all the ends to make the difference in the weight of the roving found from the first layers to the last.

I quote a part of a letter received from the agent of one of the best shops building fly frames. The subject was about the differential motion, still enough is said by this expert to show that my statement above is correct. The part of his letter follows:

"Another factor in this complicated problem is that the pressure of the paddles on the bobbins is nearly sufficient to keep the bobbins up to speed after the frame, as a whole, has been put up to speed, even though at that minute the train of gears driving the bobbins from the jack shaft were disengaged." Continuing, he says: "It seemed so to us that this would be true; we tried it and demonstrated it to be so."

This means that even if the cones are formed to meet the conditions referred to above, it must be admitted that as in the case of flyer fixing, the speed of the frame controls conditions, and in the latter case if the frame is driven to a higher speed than it was designed to run, the pressure of the paddle on the surface of the bobbin is increased more, and in turn this pressure aids the cone belt. The speed of the bottom cone, or excess speed is increased and results in strained work, because there is always a certain amount of cone belt slippage on all fly frames during the building of a set of roving.

To prove further what is stated above, put a fly frame up to speed, and when it is again stopped notice how the slack ends here and there about the frame will become tighter as the speed diminishes. The above is a practice carried on in all cotton mills, that is, when the ends are found to run slack we put the frame on one-half speed, or nearly so, so as to let these slack ends pass the part on the bobbin having a smaller diameter. If what is stated by the writer and the expert in question is not true, what then tightens the slack ends? This is the reason why the mathematical calculations by builders of fly frames are sometimes destroyed.

All must admit that these are facts and that changing the speed of fly frames does effect the outlines of the cones. Examine an English cone and an American cone. They are different, for the reason that we drive our fly frames on this side of the water at a higher rate of speed. As stated, in order to hold the same relationship of surface speed of the front roll and bobbin needs continual watchfulness and study of conditions, and this is at all times necessary. Temperature and humidity can be controlled nowadays with considerable accuracy. However, some variations are inevitable, but eternal vigilance can assist greatly in maintaining that relation which theory and practice have shown to be the best.

The most important parts of fly frames are the cones and connections from the bottom cone to the bobbin gears, and here is where most of the bad work is made, much through carelessness, neglect, and not understanding the winding-on principle and functions of the flyers from the beginning to the end of the set. Bad tension conditions on a speeder are generally caused by the carelessness of speeder tender, oiler or fixer, and the fixer, or second hand, who refuses to change the tender's rack or gear when conditions demand it, should be immediately discharged. Overseers and fixers who understand the importance of the winding-on problem are a great help and encouragement to either poor or good speeder tenders.

I have noticed of late that many writers advocate reducing the number of doublings, and shorter drafts. This is wrong, because more doublings remedy bad piecings, lengths of light and heavy strands, caused by uneven laps, and also the light work caused by the stripping of the card, which all of course assist in making the roving defective. Many mills have lately increased the doublings at every delivery of drawing, where six ends were run at the back, this number is increased to eight. The draft on the drawing was only increased slightly as the weight of the card sliver was reduced, and the doffer speeded to almost the same proportion. This has been found to give the best results in making an even strand, and it is safe to say that many other mills will fall into line. That all builders foresaw the adoption of this plan by many mills is evident from the number of slots found in most guide plates on the latest drawings turned out. The only fault that can be found running two into one on fly frames, spinning, or mules, is that when running short stock, the two strands will at times separate and when they came together again will in some cases pluck the clearer waste and cause small dirty slubs in the yarn. Such places in the yarn receives very little twist owing to the twist running always to the part of the thread having the smallest diameter, and this gives the yarn the appearance as if a part of it was not properly drawn by the drawing rolls.

In order to reduce the defective places in the roving we must double the strands at every opportunity, that is why it is that the finer yarn you make the more doublings that are necessary. Even in a print cloth mill the sliver should never exceed 50 grains per yard. The slubber roving should not be heavier than .60 hank, and the intermediate no heavier than 1.65 hank to make 4.5 hank roving. However, in most print mills, we find a 60 grain sliver on the cards, .50 hank roving on the slubber, and 1.50 on the intermediates to make 4.5 hank roving on the fine speeders. Now, if any reader of COTTON has the latter "hang-up," let him change to the one advocated above, and the result will surprise him. It will be found that the amount of waste will be reduced approximately 50 per cent, and besides, the roving will be found much more compact.

Another defect that exists in many of the cotton mills at this writing, and one that is responsible for much defective roving, is the draft between the first and second roll on the slubber. Of course a carder will tell you that he has a draft of only five on his slubbers, but most of this draft takes place between the first and second roll. You will find in many mills today where the draft between the first and second roll of the slubber is almost equal to double the draft between the first and second roll on the drawing. Some may say that the drawing roll has much more to do on account of the number of slivers under its action at the one time, but this is a poor argument because each may be said to be drawn separately between the first and second roll on the drawing the same as on the slubber. There is a difference, and a great one, too, so much so that in some mills this excessive draft found between the first and second roll will give the layers of roving on the traverse

the appearance that the carriage was dwelling at intervals. Many readers of COTTON have no doubt experienced the above, and will probably agree with the writer upon this point. The writer is a carder and has done very little changing, but when he has changed and taken charge of a card room, his first move in each case was to reduce the draft between the first and second roll on the slubbers, and if the reader be a carder he could at least try one slubber, and if this is done, I am sure he will never again have a long draft between these two rolls.

I know that we have the same draft and a longer one between these two rolls on the intermediates, fine, jack, mule, and ring frames, but notice the difference in the hank fed in at the back.

In most print cloth mills one will find a .119 hank finished drawing sliver, instead of .138 hank or what it should be. On the slubber .50 hank, when it should never be heavier than .60 hank. Two into one at the intermediate gives us $.50 \div 2 = .25$ hank fed in at the back of the intermediate. This should be enough to convince the skeptic on this point, as he should see that the number of fibers in the cross-section of the drawing sliver is double that of the slubber hank fed in at the back of the intermediate. If we had the proper hank roving fed in at the back of the intermediates, the number of fibers in the cross-section of the drawing would be almost three times greater than the number of fibers in the cross-section of the hank fed in at the intermediate.

To make the above point clearer, when one has such an excessive draft between the first and second rolls on the slubber, he is pulling the fibers a greater distance past one another at every inch passing the action of these two rolls. Then we have two extremes at this point, namely, the distance that the front roll must pull the fibers past one another, and the number of fibers in the cross-section.

Even if the rolls in the above case were well oiled and cleaned, it will be seen that a retardation of the front roll is sure to take place, especially in case of wiry cotton. By all means, reduce the draft between these two rolls if found excessive, as this has caused and is now causing much defective roving. The slubbers in some mills are equipped with metallic rolls, and in others one finds them varnished. This is a confession on the part of the mill operators that what is said above is true.

Before closing I wish to state that too great a speed makes the work run badly on any machine, causing a larger amount of breakage, and consequent loss of production, but the speed should be sacrificed instead of the draft, as there is nothing more detrimental in making the work weak and fluffy. The writer has had the pleasure of visiting many mills in both the North and South, and in every mill visited he found conditions bad wherever the slivers were heavy and the drafts excessive.

THE WEAVING OF SEAMLESS FELTS FOR PAPER MAKERS.

(*Contributed Exclusively to* COTTON)

BY MILES R. WHITHAM.

Some of the largest types of weaving machinery are designed for the weaving of paper makers felts. The loom shown at Fig. 1 has been designed for the above purpose and is for a cloth 49 feet wide. The total width of this huge loom is 65½ feet, the height 10 feet and the depth 13 feet; the net weight of this giant loom is 60,570 pounds. The length of the shuttle used is 27 inches and twelve picks per minute is a good average speed. As shown the loom is of the underpick type whilst it is provided with a head motion for controlling 27 shafts; the shuttle weighs 22 pounds. Fig. 2 shows the warping machine used in the preparation of warps for the loom illustrated. It will be noticed that the warps are built up in section, thus enabling the ordinary sizing machines, etc., to be utilized.

The weaving of seamless felt is of course based on the usual system of designing and Fig. 3 shows the whole weaving scheme for a plain seamless felt. In making the cloths it is essential that the number of warp threads used is an odd number as shown in the section. This illustration also shows how cloth 98 feet wide may be woven on this loom.

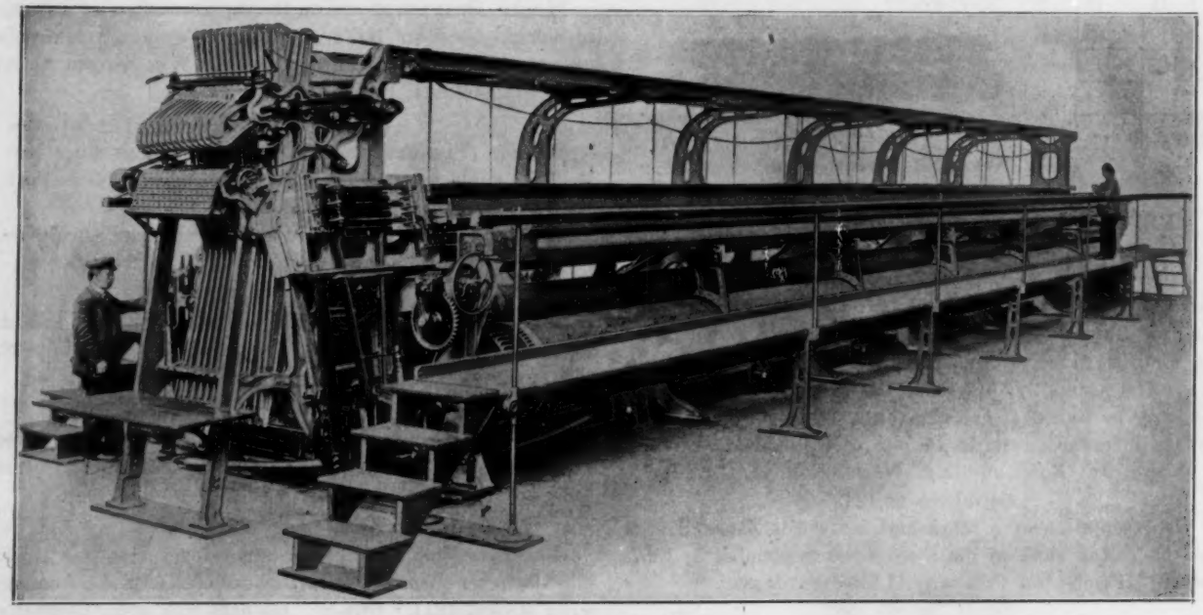


FIG. 1. A LOOM WEIGHING THIRTY TONS.

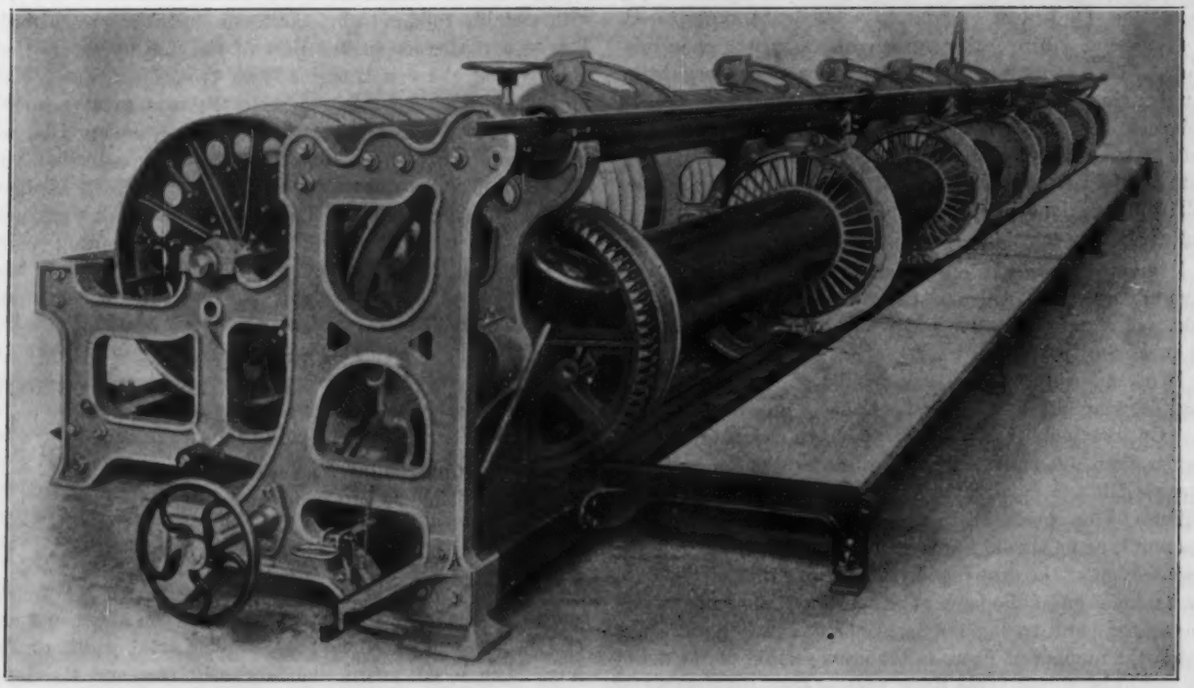


FIG. 2. WARPING MACHINE USED IN CONNECTION WITH THE LOOM ILLUSTRATED.

Large as is the loom illustrated it has been eclipsed by a recent introduction. Reports from the continent describe a loom weighing 35 tons and is 77 feet long. Another loom of lighter construction than the above is used for weaving artist's painting cloth. This loom is of 29 feet reed space and is 37 feet long over all. It is only adapted for weaving plain cloths.

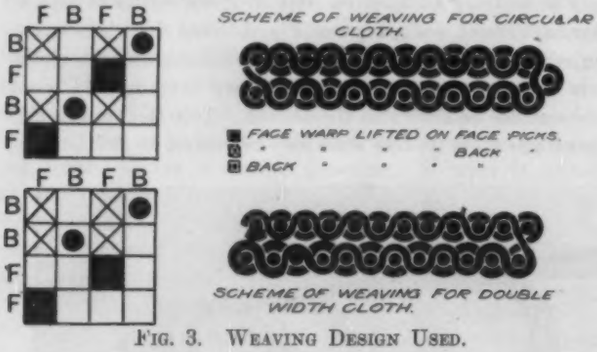


FIG. 3. WEAVING DESIGN USED.

TRADE MARKS TO BE REGISTERED.

Applications for registration of the following trademarks have been filed in the Patent Office at Washington. The names and addresses of the applicants are given. Any one who has cause to object to any registration should file his protest promptly, otherwise the certificate of registration may be issued at the expiration of thirty days. For further information write to our correspondent, Edward S. Duvall, Jr., Bond building, Washington, D. C.:

Serial No. 64,124.

Representation of a zebra and the words ZEBRA STRIPE used on cotton cloth in the piece since September 1, 1887. Owner: Pemberton Company, Lawrence, Mass.

Serial No. 65,138.

Word: BELMORE and the representation of a boll. Used on union suits, drawers, shirts, and pajamas and night shirts since July 1, 1912. Owner: Theo. F. Baulig, Egg Harbor, N. J.

Serial No. 65,699.

Representation of a woman dressed in style of 1860. Used on knitted underwear, hosiery and caps, since February 1, 1912. Owner: The William Carter Company, Needham Heights, Mass.

Serial No. 65,706.

Picture of Benj. Franklin and the words: FRANKLIN KNITTING MILLS. Used on mufflers since June 15, 1909. Owner: Franklin Knitting Mills, New York, N. Y.

Serial No. 66,149.

Word: GRANITE shown on the representation of a granite block. Used on ladies', gentlemen's and children's hosiery since July 1, 1912. Owner: Wm. Brown Company, Philadelphia, Pa.

Serial No. 66,365.

Words: SUMMER GIRL. Used on stockings since Nov. 24, 1911. Owner: O'Callaghan & Fedden, New York,

Serial No. 66,367.

Words: REMEMBER ME. Used on stockings since Nov. 24, 1911. Owner: Same as No. 66,365.

Serial No. 66,399.

Words: XRA and RAINBOW. Used on cotton thread, cotton twist, cotton yarns and sewing cotton since July 22, 1912. Owner: New England Cotton Yarn Co., Boston.

Serial No. 66,434.

Representation of a water spout and catch basin. Used on thread since Oct. 1, 1912. Owner: The Spool Cotton Company, Newark, N. J.

Serial No. 64,202.

Representation of a golden stripe near top of a stocking, the latter forming no part of the mark. Used on hosiery since March, 1911. Owner: Gotham Silk Mfg. Company, New York, N. Y.

KNITTING.

INFLUENCE OF TWIST ON YARN.

Contributed exclusively to COTTON.

BY WILLIAM DAVIS, M. A.

INFLUENCE OF TWIST ON TWO-FOLD YARN.

Twisting two single threads together gives as a rule greater strength than a corresponding count or size of single yarn. Also single yarns intended for doubling are not turned quite so hard as they would be if used alone. In folding two single yarns together, the strength of the two-fold thread is seen to increase with the twist up to a

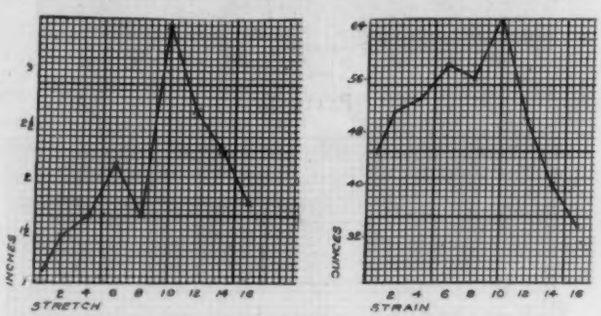


PLATE V.

certain point, which is the point of maximum strength for that particular yarn. In general, however, there is a remarkable difference from single thread curves, when this point is reached. In place of a section where the strength remains practically stationary under increased twist, the strength steadily decreases with the addition of more twist. The point of maximum strength is more easily determined than in the case of single yarns and the weakening effect of more torsion after that point, is more decidedly pronounced. To conduct the experiment an assortment of counts were used, varying from coarse to fine. The yarns were of the typical woolen variety, the coarser sizes being Cheviot and the finer sizes Saxony in character.

Example 5. The single yarn was 10 cut, equal to 1¼ run, American counts.

10s Yarn two-fold

Test No.	Turns per inch	Average strength	Average stretch
1	2	50 ozs.	1 7/16 inches
2	4	52 ozs.	1 10/16 inches
3	6	57 ozs.	2 4/16 inches
4	8	55 ozs.	1 10/16 inches
5	10	66 ozs.	3 7/16 inches

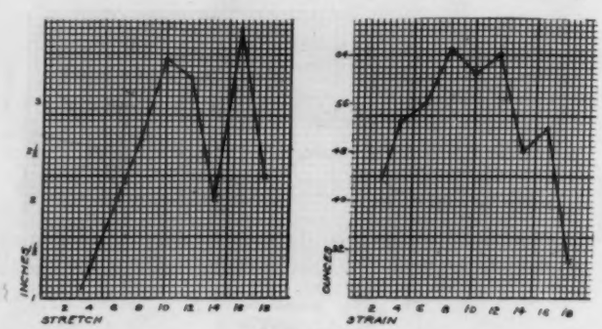


PLATE VI.

6	12	49	ozs. 2 10/16 inches
7	14	39	ozs. 2 4/16 inches
8	16	32	ozs. 1 12/16 inches
9	18 turns impossible		

Plate 5, which is plotted from this table, shows the general increase of strength up to the point of 10 turns per inch, that of maximum strength, after which it steadily decreases in strength and becomes brittle. It was found impossible, owing to the breakage of the yarns, to put on more than 16 turns.

Example 6. 15 cut 2-fold woolen yarn, equal to 1⅞ run.

Test No.	Turns per inch	Average strength	Average stretch
1	4	53 ozs.	1 5/16 inches
2	6	57 ozs.	2 inches
3	8	65 ozs.	2 10/16 inches
4	10	62 ozs.	3 7/16 inches
5	12	64 ozs.	3 4/16 inches
6	14	48 ozs.	2 inches
7	16	52 ozs.	3 12/16 inches
8	18	30 ozs.	2 4/16 inches

Maximum strength appears at eight turns in Plate 6, beyond which the results were uneven, but growing rapidly less.

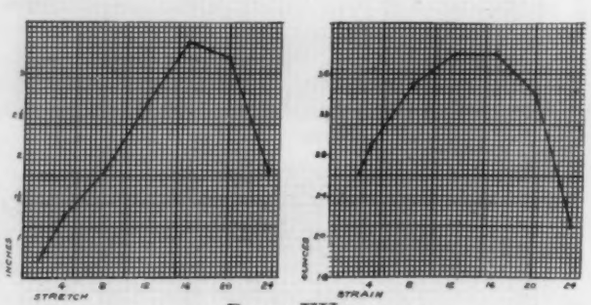


PLATE VII.

Example 7. 20 cut 2-fold woolen yarn or 2½ run.

Test No.	Turns per inch	Average strength	Average stretch
1	4	29 ozs.	1 4/16 inches
2	8	35 ozs.	1 13/16 inches
3	12	38 ozs.	2 10/16 inches
4	16	38 ozs.	3 6/16 inches
5	20	34 ozs.	3 3/16 inches
6	24	21 ozs.	1 13/16 inches
7	28 turns impossible		

Plate 7 shows the graphic curves plotted from this test.

Example 8. 25 cut 2-fold woolen yarn or 3⅛ run.

Test No.	Turns per inch	Average strength	Average stretch
1	4	20 ozs.	14/16 inches
2	8	26 ozs.	1 10/16 inches
3	12	25 ozs.	1 11/16 inches
4	16	30 ozs.	2 11/16 inches
5	20	26 ozs.	2 9/16 inches
6	24	17 ozs.	1 5/16 inches
7	28 turns impossible		

Plate 8 shows the graphic chart of this test.

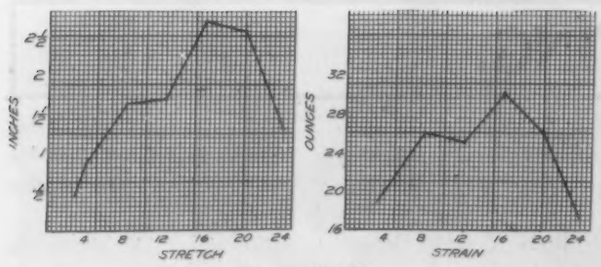


PLATE VIII.

Example 9. 30's yarn 2-fold.

Test No.	Turns per inch	Average strength	Average stretch
1	4	17 ozs.	1 3/16 inches
2	8	22 ozs.	2 inches
3	12	24 ozs.	2 5/16 inches
4	16	26 ozs.	3 4/16 inches
5	20	28 ozs.	3 3/16 inches
6	24	25 ozs.	3 7/16 inches
7	28	21 ozs.	3 inches
8	32	Breaking Point	

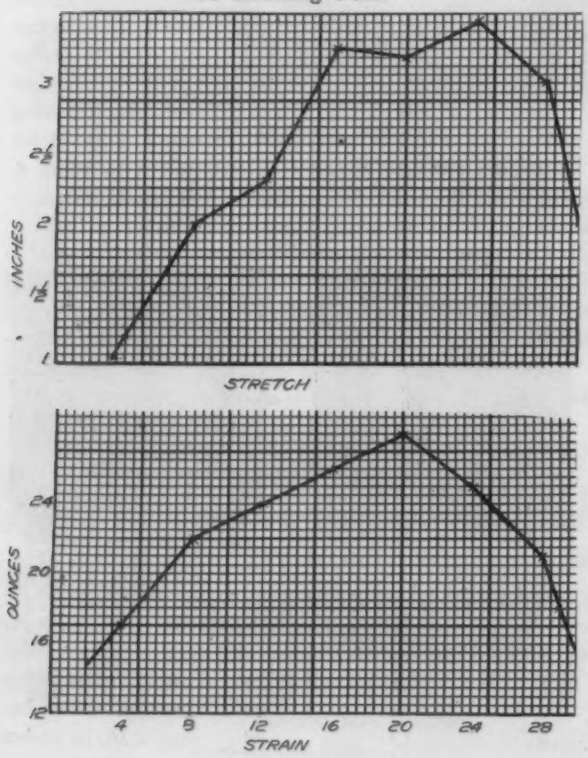
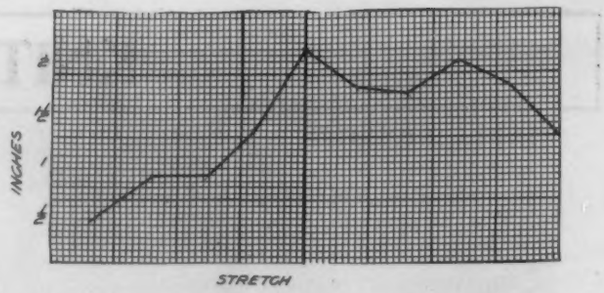


PLATE IX.

It will be noticed that all the yarns up to Example 9 have a quite decided point of maximum strain, this point being at the same time a point of maximum stretch in most instances. In Examples 10, 11 and 12, however, which are tests on the finest yarns used in the woolen trade, a change in the behavior is noticeable. The thread in fine sizes no longer exhibits the same marked maximum point. The properties of the yarn of Example 10 show very slight alteration between the stages of 12 turns and 28 turns per inch. Nor does the thread exhibit the same tendency to break under excessive torsion, the greatest increase in strength manifests itself between 4 and 16 turns per inch, after which increased torsion does not add strength in the same degree. It would therefore, seem that the finer counts



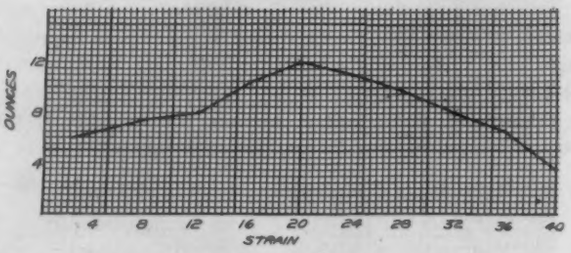
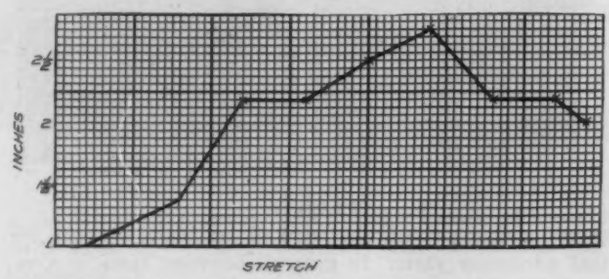


PLATE X.



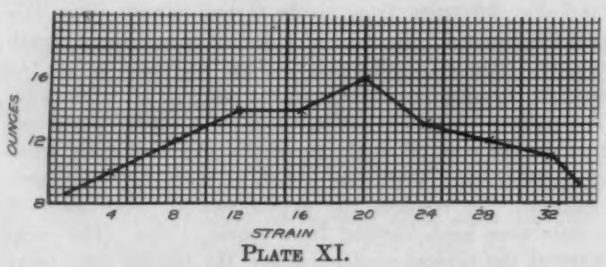
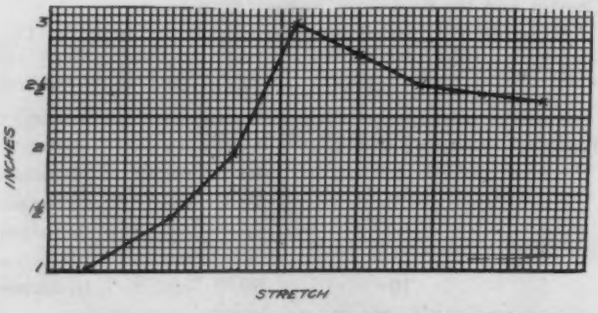


PLATE XI.



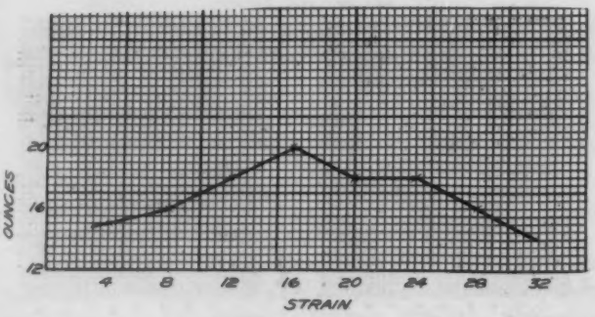


PLATE XII.

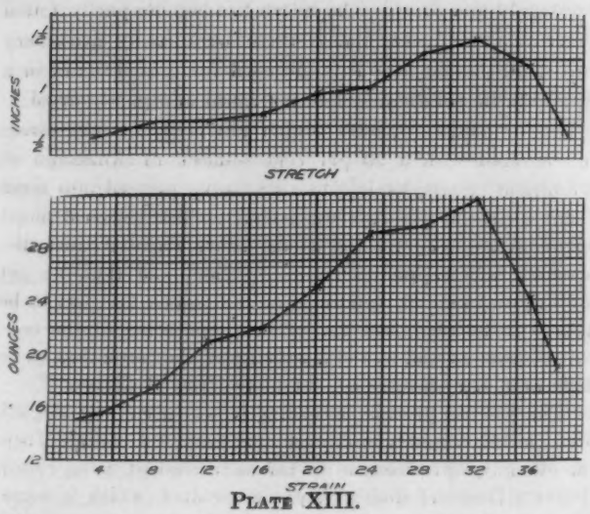


PLATE XIII.

have a greater range within which the twist can be used to produce a cloth of different handle. In fine counts, one yarn seems to become imbedded in its neighbor so that the distinctive two-fold appearance is lost.

Example 13. 20's single cotton yarn.

Test No.	Turns per inch	strength	stretch
1	4	15 2/3 ozs.	9/16 inch
2	8	17 1/3 ozs.	11/16 inch
3	12	21 ozs.	11/16 inch
4	16	22 ozs.	12/16 inch
5	20	25 ozs.	15/16 inch
6	24	29 ozs.	1 inch
7	28	29 1/3 ozs.	1 5/16 inches
8	32	31 2/3 ozs.	1 7/16 inches
9	36	24 ozs.	1 3/16 inches
10	40	Breaking Point	

The last three tests were made on single cotton yarns. Example 13 was that of a single 20's cotton yarn and the results are given in the accompanying table and plate. Both strength and stretch show a well maintained increase in strength up to 32 turns per inch, after which there is a rapid break-away.

Example 14. 40's single cotton yarn.

Test No.	Turns per inch	Average strength	Average stretch
1	4	8 2/3 ozs.	10/16 inch
2	8	11 2/8 ozs.	11/16 inch
3	12	10 6/8 ozs.	12/16 inch
4	16	11 5/8 ozs.	11/16 inch
5	20	12 ozs.	13/16 inch
6	24	10 4/8 ozs.	15/16 inch
7	28	13 1/8 ozs.	1 2/16 inches
8	32	11 ozs.	1 2/8 inches
9	36	13 7/8 ozs.	1 5/16 inches
10	40	Breaking Point	

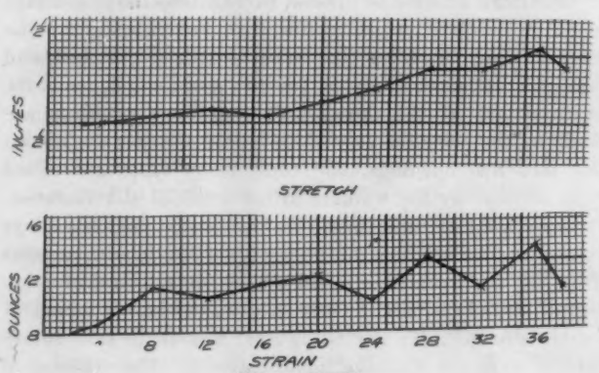


PLATE XIV.

The behaviour in Example 14 is somewhat analogous to that of the fine woolen yarns. There is no clearly defined point of maximum strain and the graphic curve from 8 to 24 turns per inch keeps much within the same limits of strength and stretch.

Example 15. 60's single cotton yarn.

Test No.	Turns per inch	Average strength	Average stretch
1	4	8 1/3 ozs.	8/16 inch
2	8	9 ozs.	10/16 inch
3	12	10 ozs.	11/16 inch
4	16	12 ozs.	13/16 inch
5	20	12 5/8 ozs.	15/16 inch
6	24	10 1/3 ozs.	11/16 inch
7	28	10 1/3 ozs.	1 2/16 inches
8	32	12 ozs.	1 3/16 inches
9	36	11 1/3 ozs.	1 9/16 inches

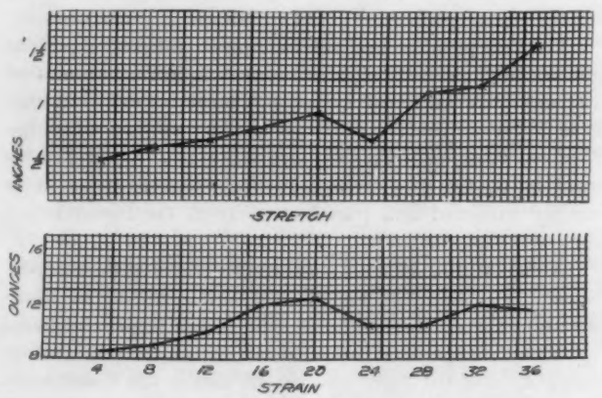


PLATE XV.

In the plate for Example 15 it can also be noted that there is but little degree of variation in the yarn qualities between 12 and 28 turns per inch.

ARTIFICIAL SILK, ITS MANUFACTURE AND USES.

(*Contributed Exclusively to* COTTON)

BY WILLIAM L. TASCH.

Only in a few rare instances, has man succeeded when he tried to compete with Nature. Frequently, however, his attempts to imitate Nature's products have led him to the invention of a material, different from the natural product in essential points, and yet of high value in spite of, or perhaps just on account of this difference.

For nearly 150 years, ever since Rèaumur, the great French Chemist, first conceived the idea of synthetically producing artificial silk, countless men tried to give us a substitute for the thread of the silkworm. None of them succeeded because they all started from an animal basis; (logically enough it would seem, since silk is an animal secretion;) and many have been the attempts to transform Albumen or Casein (the white of eggs and the solid part of milk) into pliable threads. Even to this day people are working along these lines but though they may have made silklike substances in their laboratories, they have not yet

achieved a product that could be considered practical.

It remained for a Frenchman, Count St. Hilaire de Chardonnet, to be the first to produce fibers fit for use in the Textile Industry. Though others before him, as Audemars, Swan, and Weston, had drawn cellulose into threads, it was Chardonnet who on occasion of a visit to a cellulose factory, observed the snow-white, silky masses of cellulose leaving the boilers and there conceived the idea which made him the "father of the artificial silk industry." Though a good deal of the artificial silk is nowadays made of cotton waste or raw cotton, (the pure cellulose with which nature supplies us), we will here say a few words about cellulose, the more so, as the latest process, under which the best quality of silk is made, starts with cellulose as the original product. If woodpulp is boiled with Bisulphite solutions, the Lignine (from Lignum, Latin for wood) *i. e.*, the hard incrusting parts of the wood are destroyed, and the remaining fibrous substance is called cellulose.

We all know how the silk worm spins its thread from a gummy substance, the fibroin which is created in its intestines, and we will see in the following remarks how closely human genius has imitated Nature and her work.

The first problem encountered was to obtain a liquid, as gummy as fibroin, which must possess a certain amount of viscosity, like glue and syrup, but must be so liquid that it could be squirted out through hairfine capillary openings, forming fine jets. Furthermore these thin liquid threads must be fit for easy precipitation, so that they would be readily hardened and transformed from the liquid into a solid structureless thread.

Artificial silk is now made under three different processes. The oldest of these is the Nitro-cellulose or Chardonnet process; the second in age, is the Cupro-Ammonia or Elberfeld process, so-called after the largest factory using it; and the third and by all means the foremost in importance is the Viscose process, according to which 80 per cent of the woodsilk which this country consumes is made. In the following explanation we will show you how these three different processes obtain their spinning solution, for therein lies the difference between them.

In the Nitro-cellulose process, cotton waste or raw cotton is thoroughly cleaned by boiling it under pressure in a 2 per cent solution of Caustic Soda, at a temperature above 212 degrees F., which also contains some resinous soap. The cleaned cotton is then bleached and thoroughly dried. After the drying process the cotton is put into a solution of equal parts of Nitric and Sulphuric Acids, containing about 19 per cent water. This solution has to be kept at a temperature not lower than 104 degrees F., and the cotton which must remain in there for from 20 to 30 minutes is thereby transformed into Nitro-cellulose or Collodion, which we all know from its use as a corn cure or dressing for slight skin wounds. This collodion or Pyroxlyin as it is also called, is then put into airtight containers. Here it is covered with a mixture of ether and alcohol and soon dissolved. The resulting solution now has to be filtered so as to be thoroughly freed from all foreign matters, and is then ready for spinning. The filteration is done in filter presses under strong pressure. For very viscous liquids the pressure has to be as high as 60 atmospheres.

In the Cupro-Ammonia process, longstapled cotton waste or raw cotton is boiled in an 8 per cent solution of Potash and sodium hydrate under a pressure of 2½ atmospheres. After boiling for about 3½ hours, the cotton is washed thoroughly and dried. The cotton has become partly felted under this treatment, and is therefore torn by machinery into small pieces; next it is bleached for 5 or 6 hours in a Hypochlorite solution, and then washed and partly dried.

In the meantime, pure copper has been cut into pieces and covered with a 20 per cent solution of Ammonia in cylindrical vessels, while cold air is being pressed into these under a pressure of two atmospheres. The bleached moist cotton after being treated as described above is next dissolved in the copper ammonia solution, and thus we get the Cupro-Ammonia spinning solution which also has to be filtered to be ready for use. The preparation of the copper solution as well as the dissolving of the cotton has to be done at a temperature of not more than 39 degrees F.

The Viscose process, according to which most of the silk used in this country today is manufactured, differs from the other two processes in so far as instead of using cotton it starts from cellulose as the raw product, which is somewhat cheaper than cotton. Cellulose is cut finely and then mixed by machinery with a 17 to 18 per cent solution of Caustic Soda. The resulting Alkali-cellulose is left standing for from 48 to 72 hours, and then mixed in big mixing drums with Carbonic Disulphide. These mixing drums have to revolve for about three hours at a temperature of not less than 59 degrees F., and not more than 86 degrees F., until the cellulose is finally dissolved. Then the solution is treated again with an 18 per cent solution of caustic sola, and the final result is called Viscose, a liquid of the color and consistency of glue.

The concentrated Viscose is diluted with water until we obtain the final spinning solution which contains 10 parts of the cellulose with which the process originally started in 100 parts of solution.

The apparatus used for the making of the different spinning solutions is the same as that generally used in chemical industries or in making of explosives or paper, such as centrifuges, pulping engines, boiling vats, etc.

The apparatus used for spinning is of very many different designs. To the writer's knowledge there are at least 40 ways of spinning artificial silk, but some of these are impractical, because of being too expensive while others are just about obsolete. Moreover, every factory nowadays, uses its own patented or secret process, which is continually being so improved upon, that the machinery considered as the best today, may be found on the scrapheap tomorrow. For these reasons and on account of the limited space at our disposal, we have thought it advisable to draw only the broad outlines of the principles, according to which the spinning solution is spun into threads.

The thick solution is pressed through capillary openings under a pressure, which varies with the viscosity of the solution, and therefore has to be carefully watched and readjusted at short intervals, for on these facts depends the uniform size of the thread. The capillary openings are made on the premises very simply. Glass tubes are drawn out into fine openings, and these short tubes are called "silk worms" by the workers in the artificial silk factories. Another kind of "silkworm" that is mostly used nowadays is shaped like the rose of a tiny showerbath and contains from 10 to 30 hairfine openings, which give a like number of strands of silk. These are twisted into a thread of usable strength; for the "silkworm" is kept in slow rotary motion while the spinning liquid leaves it. The diameter of the capillary openings runs according to the size of the

silk desired from 1/300 to 1/50 of an inch. The liquid thread leaves the spinning tubes and enters a precipitant, consisting of a very diluted acid. From this acid bath, the thread is caught upon a reel, and carefully skeined, while it is wet. In another patent the still viscous thread is fastened to a glass cylinder, and is wound around same, while being all the time immersed in a thin acid solution. Under this process the thread is slightly stretched and becomes more lustrous, though it loses in strength.

According to the Chardonnet process, the spinning is done without the aid of a precipitant, as the ether and alcohol in which the cellulose is dissolved evaporate very quickly in the open air, and the thread hardens in a minimal fraction of a second. This process is called the dry process.

The skeined silk is next thoroughly washed, and freed from all foreign chemical matter, which may have clung to it in the complicated process of manufacturing. The still wet silk is then spooled on small twisting spools, and the threads contain from ten to thirty ends, it is slightly twisted, so as to receive a uniform smooth appearance. The twisted silk is then put up in skeins of a thousand yards each on silk winders. These winders work exactly opposite to the principle of the well-known cotton or silk-winder, for the reel is being revolved, while the spool stands still. The skeins are then weighed and sized in deniers like real silk, a denier being a thread of 450 meters or 492 yards, which weigh 0.05 gramms, or a mite less than a grain. A thread of 100 denier is consequently a thread 492 yards of which weight 77.1618 grains. The deniers most used are 130, 150, 300 and 450, with a yardage of 34,400, 29,800, 14,900, or 10,000 per pound respectively.

Of highest importance for the practical use of artificial silk, next to its strength and lustre is the way in which the silk is skeined. Poor skeining brings up the expense of winding, and the loss connected with it so high as to make good skeining an element of the utmost importance. This is the more especially true since in the dyeing of artificial silk a poorly wound skein will get hopelessly entangled, the single threads being apt to stick together while they are wet. Chardonnet silk shows the same attitude towards dyestuffs that animal fibers, silk and wool show, while the Elberfield and Viscose silks resemble that of cotton, particularly mercerized cotton, a fact which is easily accounted for by their mode of manufacture. Unevenness of thread causes a shading in the artificial silk, for the dye will penetrate the thinner parts of the thread deeper than it does the thicker parts. This drawback, however, has been overcome for all practical purposes, because the reputable manufacturers sort their finished product into three grades—A, B and C qualities—and while a "C" silk is likely to contain a good many uneven spots, and may be poorly skeined, the "B" quality is considered fair by many users, and the "A" quality is as high class a thread as can possibly be obtained. Some manufacturers produce a thick, hard, artificial silk as a side-line, under the name of artificial horsehair. Naturally enough, this product lacks the elasticity of real horsehair, but it has very high lustre, and is therefore used to good advantage for millinery purposes.

Artificial silk has not the strength of real silk. When moistened its threads will tear like tissue paper, but its lustre is so far superior to that of silk or mercerized cotton that it has found great favor with numerous lines of textile manufacturing. The braid industry now using artificial silk in large quantities, can produce articles of high lustre, and in a large variety of colors, which are cheap enough to be generally used.

The knitting trade is making neckties, mufflers and shawls out of woodsilk that are low priced enough to be within the means of anybody, and beautiful enough to appeal to everybody. Hosiery, too, is made out of woodsilk, and the result is a very high-class looking article at a very reasonable figure. In connection with mercerized cotton or wool, the manufacturers of sweaters have found it to *great advantage* to use artificial silk for ornamental purposes. The hand and machine embroidery trade has for many years used artificial silk with like benefit, and it is exceptionally well adapted for the making of heavier laces, as Macrame, Venise, etc. The upholstery trade has also profited greatly by the use of artificial silk, for aside from obtaining better looking materials for draperies and coverings at a cheaper price, a piece of goods made of artificial silk is less rough than that made of other stuffs, and therefore will not gather the dust as quickly as others do, and can be cleaned more readily. Velvet and plush manufacturers and the dress goods and shirting trade, have likewise been using this wonderful material, and its market grows larger, and its use in the textile world grows wider from week to week. The electric industries use artificial silk for coverings of wires, as it is a better insulator than any other known material except rubber, and a German factory knits gas mantles of artificial silk, which will absorb the impregnating chemicals, better than those knitted of ramie and which therefore last longer than the ordinary mantles do.

The above explanations cannot possibly do full justice to our subject for the different features pertaining to the different processes, and apparatus used in the manufacturing are covered by about 250 German, 100 French, 30 American and at least 100 other patents of different countries, but a textile material, the production of which has risen from 30,000 pounds in 1891 to 12,000,000 pounds in 1911, compared with a production of 60,000,000 pounds of real silk, is of sufficient significance and importance to be brought to the attention of the textile manufacturers at large. When one takes into consideration the price, which ranges from $1.75 to $2.10 per pound, according to the quality and size, there can be no further doubt that a closer investigation of this beautiful, highly lustrous thread will prove extremely interesting to every manufacturer of textiles.

Vice-Consul General E. G. Babbitt, of Yokahama, reports that the foreign commerce of Japan for the 11 months ended with November, 1912, had a total value of $520,908,000, a gain of $81,174,000, or 18.9 per cent, over the trade of the corresponding months of 1911. Of this increase, $48,306,000 represents the advance in Japan's imports, the gain in imports of raw cotton being marked.

The report comes from Manchester that the Alexandria General Produce Association has issued an estimate of the Egyptian crop for the current season at 7,750,000 cantars (practically 775,000,000 pounds), or 25,000,000 pounds greater than last year.

The total tonnage of vessels, steam and sail, entered and cleared at the port of Shanghai, in 1911, was 42,367 tons less than in 1910. Steam tonnage increased by 500,916 tons, while that of sailing vessels decreased by 543,283 tons, Japanese and Chinese tonnage bearing the shortage.

DYEING, BLEACHING AND FINISHING.

THE VALUE OF COMMERCIAL STARCHES FOR COTTON MILL PURPOSES.*

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Large quantities of starch are used annually by the cotton mills in the processes of sizing and finishing. This yarn is prepared for weaving by a process known as sizing, in which it is treated in a solution of starch to give it certain properties essential to good weaving. When the cloth comes from the loom it is put through a process known as finishing to produce a certain "finish" before it is ready for the market. It is essential to good weaving that the yarn be properly sized before going to the loom and with many grades of cloth the finish produced by the starch largely determines the market price of the goods. It is therefore seen that starch plays a very important part in the manufacture of cotton goods, and hence the purchase of the kind of starch best adapted to the purpose in hand is a very important matter.

The object of sizing is to make the yarn stiffer, increase the strength and put it into proper condition for weaving. To accomplish this the size must penetrate the yarn to some extent and also form a coating on the surface of the thread, which prevents wear of thread in the loom. The size is prepared by boiling the starch (and other ingredients) with water in an iron kettle known as the size-kettle. When the mixture has been boiled for a sufficient length of time it is run out into the size-box of the sizing machine and kept hot while the yarn is passed through it. Two systems of sizing are in use: the short chain system, or old system, in which the yarn is sized in hanks, and the long chain or slasher system in which the yarn is sized from the beam. The same results are obtained by both systems, the slasher system being faster than the short chain system. In both systems the yarn is dried as soon as it comes from the starch solution.

The object of finishing is to increase the stiffness of the cloth and produce a finish and feel on the cloth which are very important factors in marketing cotton goods. The finish mixture is prepared in a manner similar to the size mixture and is applied to the cloth while hot. When the cloth is dry it is calendered to bring out the finish. The use of a starch solution alone in these operations would make the goods too stiff and produce a harshness which is not desirable. To modify this effect many softening agents are used, such as tallow, oils, soaps, glycerine, etc. As finishing is the final operation it is very important that it should be properly carried out and the best effect obtained from the starch. If it is desired to increase the weight of the goods this can best be done in the finishing process. For this purpose the finishing mixture is made very thick, or where this would produce too much stiffness in the cloth thin boiling starches may be used to give the weight without undue stiffness.

The principal starches used in the textile industry are corn, potato, cassava, sago, and to a small extent wheat and rice. Wheat and rice starches are, however, more largely used as laundry starches.

The value of starch for cotton mill purposes depends on its property of swelling and forming a viscous solution when treated with hot water. It is well known in practice that the different starches produce different effects in sizing and finishing. One kind of starch will penetrate the goods better than another. This variation is due to a difference in the thickness of the solutions formed by the different starches when boiled with water, that is, one starch forms a more viscous solution than another. The thickness or viscosity of the solution formed by the starch is the most important point to be known in determining the value of a starch for textile purposes, for on this depends the penetration of the starch solution into the yarn or cloth, and hence the stiffness which will be given the goods when sized or finished. As the viscosity of the starch solution is such a valuable indication of the value of the starch it is very important to have a method for determining the viscosity which will give results comparable to actual practice. The following method has been devised for this purpose:

Twelve grams of the starch are weighed into a 600 cubic centimeter beaker, 300 cubic centimeters of distilled water added (thus making a 4 per cent solution) and heated with constant stirring to the boiling point and boiled for ten minutes; 200 cubic centimeters of this solution are then poured into the cup of Scott viscosimeter, the temperature allowed to become constant, usually 94 degrees C., and 50 cubic centimeters run out into a graduate, the time being accurately measured with a stop watch. The number of seconds required to deliver 50 cubic centimeters of the solution divided by the number of seconds required to deliver 50 cubic centimeters of boiling water gives the viscosity.[1]

It will be noticed from this that the starch solution is prepared by boiling with water as is done in sizing and finishing and the viscosity is measured at very near the boiling point of the solution, so that the figures obtained show the effect of boiling on the different starches.

The viscosities of the prinicpal commercial starches are shown in the following table:

TABLE 1. VISCOSITIES OF COMMERCIAL STARCHES.
(12 grams starch in 300 cc. water, boiled ten minutes).

Starch	Viscosity.
Corn	3.05
Potato	14.31
Cassava	3.92
Sago	1.57
Wheat	1.25
Rice	1.00

From the above table it is seen that there is a wide variation in the viscosities of the different starches and hence a wide variation in their value for mill purposes. The viscosity of potato starch is much higher than that of any other starch, but there is also a considerable variation between the viscosities of the other starches. The importance of the viscosity will be seen more fully in the next section in showing the effect of boiling on the viscosity of starch solutions. It has been found that there is frequently con-

*From the Journal of the Elisha Mitchell Scientific Society for December, 1912.

*A detail description of this method was published in the Journal of Industrial and Engineering Chemistry, Vol. IV., No. 6, 1912. Also in Cotton for August, 1912.

siderable variation in the viscosities of different lots of the same kind of starch. It would be very advantageous to the mills for each lot of the same kind of starch to have a uniform viscosity. This would make it possible to obtain the same results in sizing and finishing without changing the formula for each lot of starch.

In practice the starch solution is boiled from thirty minutes to one hour before being used. It is therefore very important to know the effect produced by boiling on the viscosity of the starch solution. This is shown in the following table:

TABLE II. SHOWING THE EFFECT OF BOILING ON THE VISCOSITIES OF COMMERCIAL STARCHES.
(12 grams starch in 300 cc. water).

Starch	Minutes Boiled	Viscosity
Corn	at boil	2.15
Corn	10	2.73
Corn	20	4.26
Corn	30	7.00
Potato	at boil	16.37
Potato	5	19.51
Potato	10	14.31
Potato	30	6.33
Cassava	at boil	9.93
Cassava	5	4.53
Cassava	10	3.88
Cassava	20	3.91
Cassava	30	4.17
Sago	at boil	1.88
Sago	5	1.62
Sago	10	1.57
Sago	30	1.66
Wheat	at boil	1.20
Wheat	5	1.22
Wheat	10	1.26
Wheat	20	1.24
Wheat	30	1.33
Rice	at boil	1.00
Rice	10	1.00
Rice	30	1.08

From the above table it will be seen that the viscosity of corn starch increases uniformly with the length of time of boiling. This increase is about what would be expected with the concentration of the solution when there is no change in the starch. This is a very valuable property of corn starch as compared with other starches and gives corn starch a much wider application in the textile industry than any other starch. The value of this property will be seen more clearly by comparison with potato starch.

Potato starch reaches its maximum viscosity after being boiled five minutes. From this point the viscosity decreases rapidly with the increase in time of boiling, the concentration of the solution apparently having no effect on the viscosity. After boiling ten minutes potato starch has a viscosity slightly more than five times as great as corn starch, while after boiling thirty minutes the viscosity of potato starch is less than that of corn starch which has been boiled the same length of time. This property of potato starch of liquefying on boiling is a very important point to be considered in using this starch. In sizing the starch is boiled from thirty minutes to one hour before being used, hence, as will be seen from the table, a size mixture made of potato starch will have a viscosity less than that of a similar size made of corn starch at the time is is ready to be applied to the yarn. In other words, the potato starch size will not be as valuable for sizing as the corn starch size, but it will cost approximately twice as much as the size made from corn starch.

Cassava starch attains its maximum at the boiling point. The solution apparently has a higher viscosity shortly after complete gelatinization takes place, but no measurements were made of this as the starch is not used until it has been boiled. After reaching the boiling point the viscosity decreases uniformly with the length of time of boiling. After boiling thirty minutes there is an increase in the viscosity over that of the solution boiled twenty minutes. This increase is probably due to increase in concentration. As will be seen from the table, cassava starch behaves in a manner very similar to potato starch as regards liquefaction of the solution, but not to the same extent. Cassava starch therefore has a much broader application in sizing and finishing than potato starch.

Sago starch has a much lower viscosity than any of the starches so far considered. Like cassava starch it apparently has a higher viscosity at the time of complete gelatinization, but no measurements were made of this. The viscosity is highest at the boiling point and decreases uniformly on boiling, though not to the same extent as the other starches. After boiling thirty minutes there is a slight increase in viscosity due to the concentration of the solution. While having a considerably lower viscosity, sago starch is quite similar to cassava starch as regards the effect of boiling on the solution.

Wheat starch shows a gradual increase in viscosity with the time of boiling, similar to corn starch, though the total increase is small, the viscosity of the thirty minute determination being only slightly higher than the determination made at the boiling point.

Rice starch has the same viscosity as water when measured under these conditions. At the end of thirty minutes boiling it shows only a very slight increase in viscosity.

The marked differences in the effect of boiling on the viscosities of the different starches is due to the fact that some starches form soluble starch products more readily than others. The data given in the preceding table shows very plainly the importance of the viscosity in determining the value of starch for mill purposes.

SPECIAL OR TREATED STARCHES.

A number of special starches are now used which have been treated so as to make them "thin boiling starches," that is, when boiled the solution has a lower viscosity than the natural starches. These usually consist of corn starch which has been treated in some way to reduce the viscosity. The viscosities of several such starches are shown in the following table:

TABLE III. VISCOSITIES OF SPECIAL OR TREATED STARCHES.
(12 grams starch in 300 cc. water, boiled ten minutes).

Starch	Viscosity.
Eagle Finishing	1.15
N Starch Alkaline	2.13
Famous N	1.17
Erkenbrecher's Modified	1.13
T. B. Crystal No. 75	1.11
T. B. Crystal No. 90	1.04
Special Warp Sizing	3.48

There are quite a number of processes for treating starches to reduce the viscosity or make them thin boiling starches. In the table above the Eagle Finishing Starch is a treated starch containing a small amount of borax and is

slightly alkaline. The viscosity of the alkaline N starch has been reduced by the addition of a small amount of alkali. The other starches given in the table have been treated to reduce the viscosity and are neutral in reaction. The effect of several reagents on the viscostiy of starches has been shown in a previous paper.*

It will be seen from this table that the viscosities of the treated starches cover quite a wide range, from a viscosity slightly less than that of corn starch to a viscosity only slightly higher than water. The special warp sizing starch is a pulverized corn starch. It is frequently claimed that pulverized starch makes a smoother size mixture than the ordinary granular starch. These treated starches, on account of having lower viscosities than untreated starches, are of value in sizing and finishing to obtain more penetration of the starch into the yarn or cloth and to increase the amount of starch which is put into the goods. This may be accomplished by using the treated starch in place of the untreated and increasing the amount used by mixing the treated starch with the untreated starch in such proportion as to secure the desired results. For instance, in sizing or finishing if the mixture contains 50 pounds of corn starch to 100 gallons of water and it is desired to increase the amount of starch put into the goods nearly double this amount of a thin boiling starch could be used which has a viscosity of half of that of corn starch and still obtain a size mixture with the same thickness or viscosity as with the 50 pounds of corn starch. In other words nearly twice as much starch would be put into the yarn, thereby increasing the weight of the yarn, by using the thin boiling starch than by using the untreated corn starch. This is shown in the following formulæ for sizing No. 26 yarns which are taken from actual practice:

100 gallons of water
50 pounds of corn starch.

100 gallons of water
95 pounds Eagle Finishing Starch.

It will be noted from the table of viscosities that Eagle Finishing Starch has a viscosity slightly less than half of that of untreated corn starch and hence when this starch is used the amount can be nearly doubled without effecting the penetration.

By comparing the following formula for sizing No. 26 yarns with the first formula given it will be seen how the amount of starch may be increased and at the same time obtain greater penetration and more weight than with untreated corn starch:

100 gallons of water
80 pounds Eagle Finishing Starch.

The following formula for sizing No. 26 yarns shows the use of another treated starch:

100 gallons of water
65 pounds Alkaline Starch.

It will be noted from the table of viscosities that this starch has a viscosity of 2.13 or slightly lower than corn starch and hence a larger amount of it can be used.

In making investigations on the value of the different commercial starches for cotton mill purposes the author has received very valuable assistance from many of the cotton mills in North Carolina. A large number of mills have very kindly sent in reports showing the kind of starch which they use and the method of preparing the starch for sizing and finishing. Below are a given number of typical formulæ for sizing by the long chain or slasher system which are in actual use by the mills. For convenience of comparison the formulæ have been calculated to a basis of 100 gallons of water. As there is such a great variety of softening agents in general use by the mills the amount of softener has not been included in the formulæ. The average amount of softener used in sizing is approximately 15 pounds of tallow, or its equivalent, to 100 pounds of starch or 1.5 pounds to each 10 pounds of starch. The amount used varies, of course, with the yarn numbers and the method of sizing.

For yarn Nos. 14 s and 20 s.
100 gallons of water
66 pounds Eagle Finishing Starch.

For yarn Nos. 14 s and 22 s.
100 gallons of water
71 pounds Eagle Finishing Starch.

These formulæ are used on practically the same yarn numbers. The first one, using 66 pounds of starch, will give greater penetration than the second, but the second formula will give more weight to the yarn.

For yarn No. 16.
100 gallons of water
63 pounds of corn starch.

In this formula, using an untreated starch, a smaller quantity of starch is used than in the other formulæ where treated starch is used.

For yarn No. 21.
100 gallons of water
62 pounds of corn starch.

For yarn No. 23.
100 gallons of water
60 pounds corn starch.

For yarn No. 26.
100 gallons of water
50 pounds corn starch.

100 gallons of water
95 pounds Eagle Finishing Starch.

100 gallons of water
80 pounds Eagle Finishing Starch.

100 gallons of water
65 pounds Alkaline N Starch.

These formulæ for 26 s show how different starches may be used to increase the penetration and vary the amount of starch put into the yarn, thereby increasing the weight of the warp.

For yarn Nos. 28 s and 36 s.
100 gallons of water
65 pounds potato starch.

*Journal of Industrial and Engineering Chemistry, Vol. IV, No. 6, 1912. Also in Cotton for August, 1912.

For yarn No. 28½.
100 gallons of water
80 pounds Famous N Starch.

For yarn No. 30.
100 gallons of water
65 pounds Famous N Starch.

100 gallons of water
65 pounds corn starch.

These formulæ for 30 s show how more penetration and hence more weight may be obtained by using a thin boiling starch in place of an untreated starch.

For yarn No. 36.
100 gallons of water
48 pounds potato starch.

For yarn No. 40.
100 gallons of water
65 pounds Eagle Finishing Starch.

100 gallons of water
70 pounds potato starch.

In comparing the amounts of starch used in the different formulæ, the viscosity of the different starches should be kept in mind as it will be noted that when large amounts of starch are used, the treated or thin boiling starches are used in place of the untreated starch which has a higher viscosity.

In sizing by the short chain system more starch is required and a thicker solution is used than in sizing by the long chain or slasher system. This is due to the fact that the yarn is not stretched as much in short chain sizing as it is on the slashing machine and hence the starch solution penetrates the yarn more readily. For example, a size mixture composed of 120 gallons of water, 65 pounds of starch and 8 pounds of tallow will size about 720 pounds of No. 14½ yarn by the short chain system, while by the slasher system the same amount of size will be sufficient for about 950 pounds of the same yarn.

In preparing the starch for use it is very important that the size be thoroughly boiled before being used. In the reports which the author has received from the cotton mills it is always recommended to boil the size mixture from thirty minutes to one hour before using. From this it is safe to say that the size mixture should be boiled for not less than forty-five minutes before being used.

From the data which has been presented in this article it is seen that the viscosity of the starch solution is the important point to be considered in determining the value of a starch for textile purposes. There is another property of starch which is of value in the textile industry which is not shown by the viscosity, that is the finish which is imparted to the goods by the starch. Potato and cassava starch are said to produce a smooth finish, while corn and rice starch are said to produce a harsh finish. While this property may be of value in sizing and finishing some grades of goods, still no matter which one of the starches is used some softening agent must be used with it to modify the effect of the starch and it is therefore best in the majority of cases to use a cheap starch and control the finish by the use of softeners than to control the finish by varying the kind of starch used.

Sufficient data has been given to show the value of the different starches for textile purposes. There is a wide variation in the viscosity of the different starches and in the effect of boiling on the viscosities and as this is such an important factor in sizing and finishing it must be taken into consideration in selecting the starch to be used in cotton mills. As starch plays such an important part in the manufacture of cotton goods it is very important for the manufacturer to use the kind of starch which will produce the desired results most economically.

According to Lunge, the principal applications of sulphuric acid are the following:

1. *In a more or less dilute state* (*say from* 144 *degrees Twad, downward.*)—For making sulphate of soda (salt cake) and hydrochloric acid, and therefore ultimately for soda ash, bleaching powder, soap, glass, and innumerable other products. Further, for superphosphates and other artificial manures. These two applications probably consume nine-tenths of all the sulphuric acid produced. Further applications are for prparing sulphurous, nitric, phosphoric, hydrofluoric, boric, carbonic, chromic, oxalic, tartaric, citric, acetic, and stearic acids; in preparing phosphorus, iodine, bromine, the sulphates of potassium, ammonium, barium (blanc fixe), calcium (pearlhardening); especially also for precipitating baryta or lime as sulphates for chemical processes; sulphates of magnesium, aluminum, iron, zinc, copper, mercury (as intermediate stage for calomel and corrosive sublimate); in the metallurgy of copper, cobalt, nickel, platinum, silver, etc.; for manufacturing potassium bichromate; for working galvanic cells, such as are used in telegraphy, in electroplating, etc.; for manufacturing ordinary ether and the composite ethers; for making or purifying many organic coloring matters, especially in the oxidizing mixture of potassium bichromate and sulphuric acid; for parchment paper; for purifying many mineral oils, and sometimes coal gas; for manufacturing starch, sirup and sugar; for the saccharification of corn; for neutralizing the alkaline reaction of fermenting liquors, such as molasses; for effervescent drinks; for preparing tallow previous to melting it; for recovering the fatty acids from soapsuds; for destroying vegetable fibers in mixed fabrics; generally, in dyeing, calico printing, tanning, as a chemical reagent in innumerable cases; in medicine against lead poising, and in many other cases.

2. *In a concentrated state.*—For manufacturing the fatty acids by distillation; purifying colza oil; for purifying benzine, petroleum, paraffin oil, and other mineral oils; for drying air, especially for laboratory purposes, but also for drying gases for manufacturing processes (for this, weaker acid also can be used); for the production of ice by the rapid evaporation of water in a vacuum; for refining gold and silver, desilvering copper, etc.; for making organosulphonic acids; manufacturing indigo; preparing many nitro compounds and nitric ethers, especially in manufacturing nitroglycerin, pyroxylin, nitrobenzine, picric acid, etc.

3. *As Nordhausen fuming oil of vitriol* (*anhydride*).—For manufacturing certain organosulphonic acids (in the manufacture of alizarin, eosin, indigo, etc.); for purifying ozokerite; for making shoe blacking; for bringing ordinary concentrated acid up to the highest strength as required in the manufacture of pyroxylin; and for other purposes.

Practical Problems Discussed by Cotton's Readers

We invite our readers to make use of this department for the discussion of any and all problems arising in the mill or the finishing plant. Questions, answers or letters need not conform to any particular style and will be properly edited before publishing. The editors do not hold themselves responsible for any statements of opinion or fact which may appear in this department unless so indorsed. This department is open to all.

FURTHER QUESTIONS ON BALANCE TWIST.

EDITOR COTTON:

Do you know where I can find out if there is any practical or theoretical rule for finding the number of turns of twist to put into a cotton ply yarn to get the balance twist, the turns twist in the single and the number of yarn in the single being known? Can it also be figured what twist would be required to be put into a cabled cotton yarn to get the balance twist in the finished ply? Any information or suggestions on this subject would be greatly appreciated.

What I mean by balance twist is as follows: Suppose we put 18 turns of right-hand twist in a single 23's yarn, what number of turns of left-hand twist must I put into 11's two-ply yarn in order that the two twists will balance each other? That is hang "dead" when held in a loop and not twist to right or left.

Another example would be, if there are 18 turns in 16's single, what number of turns in a five-ply twine would balance this twist in the single?

Still another example would be, if there are 21 turns of twist in a 30's single, what number of turns in a two-ply would balance the turns of twist in this single?

W. C. (Massachusetts).

ANSWERING "G. E. C." ON WASTE LOSS.

EDITOR COTTON:

The percentages I used and the method of obtaining the results were intended to be only approximately correct. It is impossible to tell exactly the amount or per cent of waste that will be made in working any given program, but we know that certain losses will occur which can be fairly accurately estimated. My purpose was to make an allowance, in each case based on the total spinning production that would be large enough to cover any actual legitimate losses that would occur in putting the program into actual practice. It is an old method, often used for this purpose, and is based on the spinning production being considered as 100 per cent and calling the fine frame production 102 per cent, the intermediate frame production 104 per cent, etc. In other words, the basis of the problem is the assumption that the fine frames are to produce 2 per cent more than the spinning, the intermediate frames 4 per cent more than the spinning, etc., in each case figuring a certain increase in the spinning production and letting this represent the production at that particular process.

Using the above method and the figures I gave is simply an endeavor to get sufficient production at the different processes to allow for the waste that will occur in running the program. The fault lies in the fact that this point was not made as clear as it should have been in the article referred to by "G. E. C."

The problem "G. E. C" asks a solution for is along the same lines. "How many pounds of cotton would be required in the picker-room, to give a finished production on spinning frames of 68,000 pounds, allowing for 25 per cent loss of waste?"

The per cent of waste made on a machine in a mill must be based on the amount of cotton entering the machine or mill. Then, if there is a loss of 25 per cent of the cotton started with, the amount of yarn produced on the spinning frames will be 75 per cent, the two added together making a total of 100 per cent. In the above case, with a spinning production of 68,000 pounds and 25 per cent lost as waste, the 68,000 pounds produced must represent 75 per cent of the amount of cotton required in the picker-room, then we get the total amount of cotton required as follows:

$68{,}000 \div .75 = 90{,}666.66$ pounds.

B. M. PARKER (North Carolina).

EDITOR COTTON:

If I understand the question properly "G. E. C." wants to know how many pounds of stock would have to be fed in the opening room to produce a finished production of 68,000 pounds. This is allowing 25 per cent for loss of weight. 68,000 pounds is equal to 100 per cent of the production. Therefore to find out what 68,000 pounds plus 25 per cent would be, it would be necessary to show what the starting point was, or the total number of pounds fed in the opening room. If 68,000 pounds equals 100 per cent and the waste equals 25 per cent, then together they would equal 125 per cent. 68,000 pounds times 125 per cent equals 85,000 pounds total.

As a proof of this, multiply 68,000 by .75 equals 51,000 pounds. 68,000 minus 51,000 equals 17,000 or 25 per cent of 68,000. 68,000 plus 17,000 equals 85,000 pounds or the total amount to be used in the picker room.

I believe "G. E. C." figured this problem and after finding 85,000 pounds for his total, he then figured 25 per cent of 85,000 pounds and deducted same from 85,000 pounds to see if he had 68,000 pounds for the remainder. This of course would not prove out right, owing to the fact that the greater the base, the greater the number of pounds would be in the 25 per cent, which of course would have to be deducted.

I believe the practical way is to get the 25 per cent of the 68,000 pounds finished production, and add same to the finished production, which would give the total number of pounds of raw cotton to start with in the picker room. He will find that 25 per cent of 68,000 is to 85,000, what 20 per cent of 85,000 would be to 68,000. I am interested in seeing how other readers will figure this problem.

Y. L. Y. (Georgia.)

EDITOR COTTON:

Replying to the inquiry of "G. E. C." in which he wishes to find the required number of pounds of cotton to start in the picker room to give a finished production on the spinning frames of 68,000 pounds allowing for 25 per cent loss of waste. I would handle this problem as follows:

If 68,000 pounds of yarns is 75 per cent of the cotton used, what is one per cent? One percent would be 1/75 of 68,000 pounds, or 68,000 divided by 75 equals 906.66 pounds. 100 per cent, or the total number of pounds of cotton used, would be 100 × 906.66 = 90,666 pounds. 90,666, minus 68,000 pounds, equals 22,666 pounds or the amount of waste in process. As proof of this divide 22,666 by 90,666 which equals 24.99, or the percent of waste.

TED. (Tenn.)

EDITOR COTTON:

Referring to that part of the question asked by "G.E.C." as to how many pounds of cotton would be required in the lapper room to give 68,000 pounds production net at the spinning frame, allowing 25 per cent for waste, the way I would suggest working this out would be as follows:

68,000 pounds equals 75 per cent of the gross amount of cotton used. Then if 75 per cent of the gross amount is 68,000 pounds, one per cent would be 1/75th of 68,000 pounds or 906.66 pounds. Therefore 100 per cent would be 100 times 906.66 which is 90,666 pounds.

To prove this, 90,666 pounds less 25 per cent gives 68,000 pounds.

I think the method of multiplying the net pounds required by 100 plus the percentage of waste to get the gross amount of cotton to put in the picker room is wrong, and to prove this I will again use the example suggested by "G. E. C." 68,000 times 125 is 85,000 pounds. Now, according to this calculation, 85,000 pounds is the cotton required for the picker room or 100 per cent. Then if we take 25 per cent from this amount, which is the assumed amount of waste, we only have 63,750 pounds net delivery from the spinning frames. Therefore this rule is somewhat misleading.

K. T. J. (Alabama.)

EDITOR COTTON:

Deposit $50,000 in the bank at 4 per cent and you know how much you will get in a certain time. This is one instance where theory and practice go hand in hand. Put 50,000 pounds of cotton in the openers and it is an utter impossibility to tell what the finished product will be in pounds. One can figure to a small fraction of a per cent just what the loss in waste will be on each machine from the result of the mechanical operation of the machine. But to figure the loss the hands will make is not a theoretical problem, but a practical one.

Practical problems cannot be worked out by rule and have no connection with theory, and one rule that would work in one mill would be 10 per cent out of the way in another, and especially so regarding the waste question. However, this is a question which would come under a different heading.

I must say that I agree with the criticism that has been raised against Mr. Parker's solution of the problem in question, and offer the following, which, according to the rules of percentage, I believe is correct.

Question: "How many pounds of cotton would be required in the picker room to give a finished production on spinning frames of 68,000 pounds allowing 25 per cent loss of waste?"

68,000 × 100 per cent ÷ 75 per cent = 90,666 pounds required in the picker room and showing a loss of 22,666 pounds.

I have had this subject brought up before and have heard many rules for finding the answer to the above question, but believe this to be correct.

F. W. G. (Maine.)

EDITOR COTTON:

In answer to the question of "G. E. C." in the issue for January, 1913, I should advise the following method for finding the amount of cotton needed:

We always consider that we feed to a machine 100 per cent, therefore the amount of cotton required at the start must equal 100 per cent; if the loss in waste is 25 per cent, we finish with the difference between 100 and 25, which is 75 per cent; therefore, 68,000 pounds = 75 per cent of the amount required at the start. One per cent would be 1/75 of 68,000, which is 906 2-3 pounds. 100 per cent would be 100 × 906 2-3, which is 90,666 2-3 pounds required in the picker room.

Taking an example used in "Cotton Mill Machinery Calculations" in the November, 1912, issue, the author says that 4080 pounds would be required at the start. Let us prove the example, there being 20 per cent waste between laps and finished yarn. 4080 represents 100 per cent, or the amount of cotton that we need to start with; if we lose 20 per cent we finish with the difference between 100 per cent and 20 per cent, which is 80 per cent of the amount we start with. If 4080 equals 100 per cent, one per cent would be 1/100 of 4080, or 40.8 pounds, and 80 per cent will equal 80 times 40.8, or 3240 pounds, which is 120 pounds less than the amount we must finish with. Therefore, I believe that the author is in error in this instance, and instead of multiplying by 1.20, he should divide by .80 to get the required amount of cotton to start with.

CARDER (Massachusetts).

ANSWER TO DRAFT QUESTIONS OF "BEGINNER."

EDITOR COTTON:

The draft between your middle and back rolls is changed, when you change the diameter of the two rolls, because you alter the ratio existing between the two diameters. It is similar to changing the draft by making a change in the gears, that is, the ratios existing between the different gears in a train of gearing is altered when any one of the gears are altered in size.

You have a 7/8-inch back roll and a 3/4-inch middle roll. Reducing these diameters to eighths, we get 7 and 6, and we see that the ratio between the two is 7 to 6. Now you wish to change the two rolls and use a 1-inch back roll and a 7/8-inch middle roll. Reducing these new diameters to eighths, we get 8 and 7, and we see that the ratio now existing between the two rolls is 8 to 7, which is different from what it was before, and, consequently, the draft between the two rolls will be altered, although the gears have not been changed.

If the ratio of 7 to 6, existing between the two rolls when they were 7/8 to 3/4 inches in diameter, had been retained when changing the diameters of the two there would have been no change in draft.

Beginner wants to know what size gears will have to be used with the new rolls to give the same draft as before, which was 1.07.

In this particular case the change in roll diameters will have but little effect on the draft, changing it from 1.07 to 1.09. As there is no particular necessity for changing the sizes of both the 20 and 25-tooth gears, suppose we change

one of the teeth and see what size will be required. Then we will have the following formula to simplify:

$7 \times X \div 20 \times 8 = 1.07.$

Therefore $7X \div 160 = 1.07$ or $7X = 160 \times 1.07$ and

$$X = \frac{160 \times 1.07}{7} = 24.45$$ or a 24-tooth gear.

As we cannot use a 24.45-tooth gear we will have to put on one of 24 teeth, and this will reduce the draft to 1.05. Now it is simply a question of retaining the 25-tooth gear and running a draft of 1.09 or using one of 24 teeth and getting a draft of 1.05.

Of course, by assuming a change in the size of both gears and using gears of a larger number of teeth, which is not at all necessary, we can get sizes that will come nearer to 1.07 as the draft and you would go at the figuring in the same manner as shown above, selecting some gear in place of the one of 20 teeth and working out the one to put in place of the 25-tooth gear. But as this draft is not so important as to require accuracy, it would be all right to use either 24 or 25-tooth gears, and get a draft of 1.05 or 1.09.

Star. (North Carolina.)

EDITOR COTTON:

In the December issue "Beginner" desires to know why the draft between the back and middle rolls of a spinning frame changes when the diameters of these rolls are changed, although the same gears are left on the rolls; and also what gears could be put on these rolls to retain the same draft as before?

His example calls for: back roll, ⅞-inch diameter, and 25-tooth gear; middle roll, ¾-inch diameter, and 20-tooth gear; the draft is 1.07. He desires to change the back roll to 1 inch in diameter and the middle roll to ⅞-inch in diameter.

The draft between these rolls changes because when you increase or decrease the diameter of a roll and leave on the same gear, you either increase or decrease the surface speed of these rolls.

As he states $\frac{25}{20} \times \frac{6}{7} = 1.0714$ draft.

Suppose the back roll turns 16 revolutions per minute, then the middle roll will revolve $16 \times \frac{25}{20}$ or 20 r. p. m.

Circumference of the back roll = $\frac{7}{8} \times 3.1416 = 2.7489$ inches.

Surface speed of back roll = $16 \times 2.7489 = 43.9824$ inches per minute.

Circumference of middle roll = $\frac{3}{4} \times 3.1416 = 2.3562$ inches.

Surface speed of middle roll = $20 \times 2.3562 = 47.124$ inches per minute.

$47.124 \div 43.9824 = 1.0714$ = draft obtained by using gears and diameters of rolls as given.

Now changing the diameters and leaving on the same gears we have back roll = 1 inch diameter = 25-tooth gear. Middle roll = ⅞-inch diameter = 20-tooth gear.

As the gears remain the same as before, the rolls will still revolve 16 r.p.m. for the back and 20 r.p.m. for the middle roll.

Circumference of back roll under the new conditions $1 \times 3.1416 = 3.1416$ inches.

Circumference of middle roll under the new conditions $\frac{7}{8} \times 3.1416 = 2.7489$ inches.

Surface speed of back roll = $16 \times 3.1416 = 50.2656$ inches per minute.

Surface speed of middle roll = $20 \times 2.7489 = 54.9780$ inches per minute.

$54.9780 \div 50.2656 = 1.0937$ = draft.

$1.0937 - 1.0714 = .0223$ = difference made in draft by changing diameters of rolls and not changing gears.

Now to retain 1.07 for draft and make the diameters of the rolls equal 1 inch for the back and ⅞-inch for the middle roll, the following gears would be necessary:

$\frac{25}{20} \times \frac{6}{7} = 1.0714 = 1.07$ draft.

Change the back roll to 1 inch in diameter and then we have $\frac{25}{20} \times \frac{6}{8} = .9375$ draft with 1 inch back roll.

Now make draft 1.07 by finding what gear to put on middle roll.

$1.07 : .9375 :: 20 : X.$

$X = .9375 \times 20 \div 1.07 = 17.52$ or 18 teeth.

$\frac{25}{17.52} \times \frac{6}{8} = 1.0702 =$ draft with 1 inch back roll.

Then change the middle roll to ⅞-inch diameter and we have $\frac{25}{17.52} \times \frac{7}{8} = 1.248 =$ draft with 25 teeth in back roll gear.

$1.248 : 1.07 :: 25 : X.$ Performing the ratio this equals 21.41 teeth or the required number for this gear.

Then $\frac{21.41}{17.52} \times \frac{7}{8} = 1.0692$ draft.

Therefore, if the frame is hung up in the following manner the desired result will be obtained.

Back roll, 1-inch diameter.
Back roll gear, 22 teeth.
Middle roll, ⅞-inch diameter.
Middle roll gear, 18 teeth.

$\frac{22}{18} \times \frac{7}{8} = 1.0694 = 1.07$ draft.

Carder. (Georgia.)

DOES IT MAKE CUT WORK?

EDITOR COTTON:

I have for some time been an interested reader of the Department of Practical Discussion running in COTTON. I would like to ask some of our readers if they think that when a cone on a flyer frame runs out of true it tends to make cut work. Personally, I do not think it makes so much difference in the carding department as it would in the spinning department or where the fibers are finished and tested for breakage. I would be glad to have this question discussed by some of your readers and contributors.

THE BYSTANDER (Connecticut).

To have money and let it lie idle or earning an insufficient rate of interest is exactly like hiring a man to work and paying him every day, while allowing him to do nothing one or two days a week.

NEW MACHINERY AND TRADE NOTES.

A PICKING MECHANISM.

A correspondent in the February, 1912, issue of COTTON discussed the difference in the mechanism adopted by power loom builders for getting the shuttle through the "shed" and from one shuttle box to the other. "Some half dozen might be mentioned," said the writer, "all multifarious in their elements and generally delivering the propelling power to the shuttle primarily at quite a distance therefrom, and through a labyrinth of parts and concentric movements, the total of which, if enumerated singly, would be somewhat astounding even to one daily familiar with the mechanism. That each and every one of the numerous parts need correct alignment goes without saying, as does the further fact that every moving part thereof in contact with another part either stationary or mobile, creates friction and consequently consumes power and necessitates repairs. Taking the cam shaft gear as the propelling power to the shuttle prior to the pick cam itself, it should not prove a very difficult task to eliminate the last named and eighty per cent of its subsequent concentric motions." That the inventor of the Yarborough pick motion has accomplished this task of

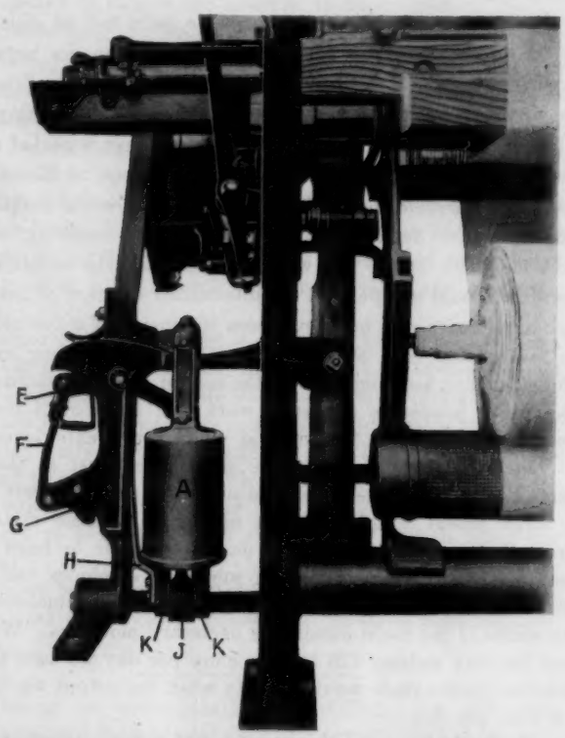

FIG. 1. PISTON OPERATED BY ECCENTRIC AT BOTTOM JUST AFTER THROWING SHUTTLE.

elimination is evident from the fact that from 140 to 200 parts are taken from a loom when applying the Yarbrough motion.

The Yarbrough pick motion is simple and practical. It will be easily understood from the following description:

A and B illustrations 1, 2 and 3 are respectively a cylinder closed at the top and a hollow piston also closed at the top. They fit neatly one within the other; there is no packing between them. J is the eccentric strap of a connecting rod. The connecting rod is attached to the inside of the piston in the same manner as connection is made to the piston of most automobile engines. Inside the eccentric strap is the usual eccentric keyed to the rocker shaft. The rocker shaft has been replaced with one 7½ inches longer at each end. Instead of being rocked in the usual manner, the rocker shaft is rotated by means of a sprocket chain drive from the crank shaft. K K are guides cast integral with the piston. It will be plain that the rotation of the

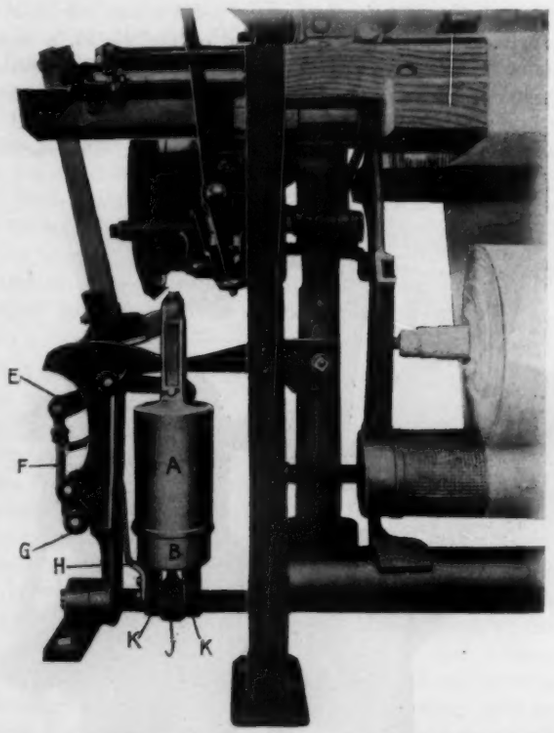

FIG. 2. PISTON OPERATED BY ECCENTRIC IN ITS TOPMOST POSITION AND READY TO THROW THE SHUTTLE.

shaft raises and lowers the piston B. Instead of the eccentric J, as shown, a crank may be employed.

Illustration, Fig. 1, shows piston B at bottom of its travel and just after the shuttle has been thrown from the left hand side of the loom.

The piston B is now lifted a distance of 1½ inches. With the lifting of piston B the cylinder A is also raised and the picker stick is rocked outward to a position, shown in Fig. 2; this position is about 2 inches short of the extreme outward point to which the picker stick will be pushed by the shuttle when the shuttle enters the box. This forms the shuttle check.

As the piston and cylinder reach the highest point in their travel, the outer end of the setting lever E drops, forcing the link F and tripping lever G into the position as shown in Fig. 2. This locks and holds the cylinder A firmly in its topmost position.

The piston B is now drawn downward and part way out of the cylinder A. As the piston B travels downward a vacuum is created inside of cylinder, A, between the closed tops of piston B and cylinder A. As the piston B travels downward the adjustable tripping dog H engages the end of the tripping lever G, rotating the lever G down and outward. This releases and unlocks the cylinder A. The vacuum that has been created inside the cylinder A acts to induce an air pressure on cylinder and piston, tending to

close or destroy the vacuum. This atmospheric pressure as every one knows is approximately 15 pounds to the square inch. The unlocking movement frees cylinder A, and permits the air pressure on cylinder A to instantly drive it downward to close the vacuum. As cylinder, A, rushes downward the shuttle is thrown.

The vacuum in the cylinder is self induced; there are no pipes, pumps or apparatus other than the illustrations show. The cylinder and piston are an easy sliding fit; any air leakage into the vacuum is discharged at the end of each stroke through a one-way clap valve.

As cylinder, A, approaches the point where the head of the cylinder would strike the head of the piston, a small amount of air is entrapped between them. This air forms a perfect elastic cushion preventing the metals from coming into actual contact; it is thus impossible for the head of the piston to strike the head of the cylinder. The working

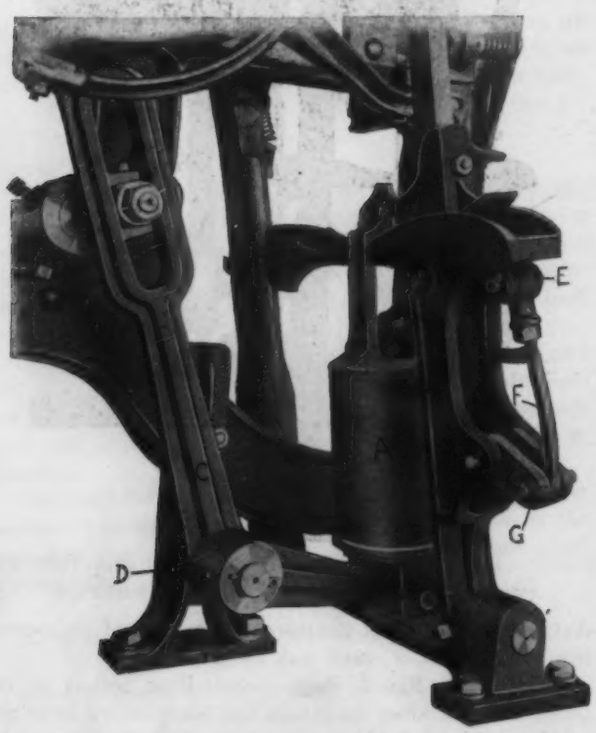

FIG. 3. VIEW FROM END OF LOOM SHOWING METHOD OF OPERATING YARBROUGH MOTION BY BELL CRANK LEVER CONNECTED WITH CRANKSHAFT.

of the cylinder and piston may be easily understood by observing the operation of the vacuum dash-pots employed on Corliss engines for the last fifty years. The action of an ordinary vacuum pump or of the air check on a door will also assist in understanding the Yarbrough vacuum principle.

When the loom stops the vacuums are closed. This makes impossible the throwing of the shuttle by any movement of the lay while the weaver is picking out.

The Yarbrough motion may also be operated through a bell crank lever, Fig. 3. In this construction the bell crank lever C is rocked by a crank attached to the cam shaft and is supported on the casting D.

Further information and booklet may be had by applying to the YARBROUGH PICK MOTION COMPANY, Grant Building, Atlanta, Ga.

THE YEAR 1912.

The December issue of *Cotton Chats*, published by the DRAPER COMPANY, of Hopedale, Mass., contains a very interesting resume of the past year, and says:

The year 1912 leaves the cotton mills of this country in a more prosperous condition than it found them. With few exceptions they are at work on orders placed at prices which will show a handsome profit.

It would be a rash individual who would undertake to forecast the conditions which will prevail one year from now. Meantime certain business factors are self-evident. First, with general prosperity there is a shortage of labor in this country, and we are therefore dependent upon immigrants to fill the ultimate vacancies; second, with their lack of experience, it is imperative that improvements in labor-saving machinery keep pace with the growth of the country, so that operatives may produce more per capita, and at the same time be able to earn the wages necessary to meet the better living conditions of the United States, as compared with those of other countries; third, it is to the mutual advantage of manufacturers and operatives that the effectiveness of the operatives be increased by improvements in machinery.

In our own foundry department we have had an object lesson on this subject. About twenty years ago, we began experiments with moulding machines, with a view of improving the quality and reducing the cost of our castings. After a trial of various types of machines over a period of several years, we found one that would average to increase the output per moulder 50 to 60 per cent, while making castings much more uniform than could be made by our best moulders in the old way; furthermore, the moulding machines could be operated by able-bodied laborers of average intelligence who had never seen the inside of a foundry. A few weeks' trial of these operatives on moulding machines, and in learning to pour the melted iron, transformed them into producers of better work and more of it than made by journeymen moulders of many years' experience.

Our Northrop loom business came along just as these facts had been demonstrated and our loom patterns were to a large extent adapted to the moulding machine system from the start; today over 90 per cent of our tonnage in loom castings is the product of moulding machines and if we desired to go back to the old method of hand moulding we doubt if we could obtain the necessary moulders. With our foundry melting 125 tons or more per day we have less old-time journeymen moulders than when the output was but 10 tons per day.

Along similar lines the evolution of cotton manufacturing in the South since about 1895 has been largely due to the invention and introduction of the Northrop loom. At that time there were but few skilled weavers in Southern territory and no surplus. The Northrop loom was an unknown quantity except as demonstrated in our experimental plant in Hopedale.

With faith in our company, in the Northrop automatic loom, and in the quality of Southern men and women, a few far-sighted men recognized their opportunity and organized and equipped what have developed into some of the largest and most prosperous cotton mills of the country.

Weavers with no previous experience whatever within a few weeks operated successfully two or more times as many Northrop loom as the old-time weavers on similar fabrics on common looms.

From this time there was a development of cotton manufacturing in the South which finally absorbed all the available labor. Today we are confronted by another situation. With no surplus labor in the country operatives of every class are looking for better openings, and natives of other countries speaking other languages are the principal source of supply. Under such conditions automatic machines that enable operatives to move up all along the line are a benefit to the individuals of each grade, and to the country at large.

A steel box baling press, manufactured by THE HYDRAULIC PRESS MFG. CO., Mount Gilead, Ohio, is undoubtedly the first of the kind ever constructed. It is built for baling waste paper, cotton waste, and loose material of various kinds. The sorting floor is located immediately over the press and the press box is filled by simply casting the material through an opening cut in the floor. The entire pressure head is shifted from over the steel box on rollers running on steel horizontal supports so that the press may be opened to receive the material to be pressed.

Three long hydraulic cylinders with rams working in them do the actual work of pressing the material. The working pressure per square inch is 3,000 pounds and the total pressure of the three rams is 200 tons. The length of run for each ram is eight feet. The size of the steel box is 24 x 68 x 120 inches. The total height above foundation is 28 feet, 4 inches. Bales may be made as small as 24 x 68 x 23 inches high. They may be made as large as 24 x 68 x 36 inches high. The pressure platen is provided with rollers for guiding it in the ascent during pressing and on its return.

After the bale has been compressed the doors are opened so that the cloth covering the bale may be sewed up and the bands fastened. These doors may all be opened at once and are fastened with cam locks. The side doors are hinged to diagonally opposite strain rods. The end doors are hinged to the side doors. Thus the press can be opened on all four sides to release the bale and so that the operator can get at it easily to sew the covering and to place the bands.

Paper bales are made weighing as high as 1,300 pounds; and paper shavings are pressed to one-third their original bulk.

Among the ornamental and useful holiday souvenirs which reached the editorial desk of COTTON, was a daily calendar pad and holder sent out by the FARBWERKE-HOECHST CO., of 122 Hudson St., New York. This company was formerly known as H. A. Metz & Co., manufacturers of aniline and alizarine colors, dyestuffs, and chemicals.

When mixed with arabol starch, corn starch, or potato starch, the sizeoleum, manufactured by THE ARABOL MFG. CO., of New York City, makes a most satisfactory sizing for cotton warps, shirtings, domestic and print cloth warps. It is especially recommended for the South, as it has the advantage of resisting the influences of the climate.

LAGRANGE IS A WIDE-AWAKE CITY.

One of the most attractive residence cities in the Southeast and also one of its most progressive business cities is LaGrange, the county seat of Troup county, Georgia. Situated on the Atlanta & West Point railroad, almost midway between Atlanta and Montgomery, it is the home of two of the oldest colleges for women, having an enrollment of between 400 and 500 students. Located at LaGrange are seven cotton mills, representing an investment of $1,722,000, and containing 81,148 spindles and 1,262 looms. These mills utilize approximately 250 bales of cotton a day, and pay out in salaries over $150,000 a week.

The Chamber of Commerce of LaGrange is composed of the most enterprising business men in the city, headed by Fuller E. Callaway, who is well known in textile circles. Edward Young Clarke is the general secretary. He states that the town wants more factories and more citizens and that local citizens will join with new-comers in financing new enterprises. He will be pleased to send further information to any person interested in locating in this wonderful section. A quarter of a million dollars' worth of construction work is at present under way.

Mill men are always interested in any machine that will make the card room show better results. This being the case, many will undoubtedly be interested in the new Smith Automatic Card Cylinder Stripper, which is manufactured by the DURANT-SMITH MACHINE CO., Atlanta, Ga., who are successors to the Camp Machine Co. It is claimed for this stripper that while it adds nothing to the power to operate the card and does not wear the clothing as badly as in the case of hand stripping, the cylinder never clogs up with cotton, and with the use of this stripper the output of the card will be increased approximately 20 per cent. Some of these strippers have been installed in the Anniston Mill at Anniston, Ala., for test purposes. The entire mill at Oxford, Ala., is now equipped and the makers report no kick from the purchasers. The LaGrange Cotton Mills are using this stripper at LaGrange, Ga., as are the Autun Mills at Pendleton, S. C. Manuel J. Stevens, of LaGrange, Ga., is the sole selling agent for the United States and Canada.

THE GROSSER KNITTING MACHINE CO., at 260 West Broadway, New York City, are sending to the trade one of the most artistic and original illustrated catalogs seen for some time. The cover represents a piece of fancy knit fabric that is perfect in production. The catalog itself illustrates various machines for the manufacture of knit goods, exclusively imported and distributed through the Grosser Knitting Machine Co. Among these may be mentioned flat knitting machines of the flat-bed latch needle type; spring needle knitting machines, "Cotton's patent;" finishing machines for fashioned and seamless goods, which includes beamers and loopers or linking machines; warp knitting machines in both the latch needle and spring beard needle types; and accessorial machines for warp knitters. The catalog is well illustrated with half-tone reproductions showing the different styles of machines with the work in place. Knitting mill officials will confer a favor upon themselves by writing for a copy of this catalog, as it contains many useful hints for bettering the various products they manufacture.

SOLVING A HARD PROBLEM.

The hardest problem for any textile mill man to meet is to keep the mill windows clean, so that the employes will have more natural light for their work.

Owing to the nature of mill work, the windows get dusty and dirty quite often, and artificial lights have to be introduced in places where the good old daylight would do, if the windows were only kept clean, but because of the dangerous part of window cleaning, they are neglected and very seldom cleaned.

Men have to risk their lives to go outside of large buildings to clean windows without some safety device to protect them from falling. There are so many accidents happening to window cleaners throughout the country that mill owners, as a rule, do not care to jeopardize their men's lives and therefore overlook dirty windows.

The BOSTON IRON WORKS, of Boston, Mass., have practically solved the problem and are introducing a "Safety Window Cleaning Platform," as shown in the illustration.

The platform is made of steel with iron railings on three sides, so that the window cleaner is absolutely safe while working on it, and has the free use of both hands and his body.

The platform has an ingenious arrangement by which it locks to the window sills like a vise, and cannot be removed before the window cleaner gets inside of the building and removes it. The apparatus weighs about 26 pounds and can be secured to or released from any window in less than a minute.

Many mill men deem it a good investment to buy a platform for their window cleaners, and have the windows cleaned oftener, thus saving on their electric light, besides not having to run the risk of their window cleaners getting injured.

THE GEORGE P. CLARK CO., of Windsor Locks, Conn., are issuing their bulletin No. J describing platform, table, baggage and express trucks. These trucks are manufactured in the usual strong, well-designed manner that apply to all products of this well-known company, and are built in numerous styles to suit any and every condition of service. Bulletin J will be forwarded upon application, to those interested.

BOOK REVIEWS.

A DICTIONARY OF APPLIED CHEMISTRY. By Sir Edward Thorpe, C. B., LL. D., F. R. S., Professor of General Chemistry and Director of the Chemical Laboratories of the Imperial College of Science and Technology, South Kensington, London; late principal of the Government Laboratories and a past president of the Chemical Society and the Society of Chemical Industry. In five volumes. Revised and enlarged edition. Numerous illustrations. Published by Longmans, Green & Co., London, New York, Bombay, and Calcutta. Price of each volume $13.50 net.

A dictionary, whether chemical or otherwise, must, in order to be really valuable to its owner, have two undisputable qualities—authenticity and thoroughness. However, there is a third quality that is almost as important as the other two—comprehensiveness. During the 22 years that have elapsed since the first volume of this work made its appearance, chemistry has advanced at a rate and to an extent altogether unprecedented in its history, or indeed in the history of any other science. This extraordinary growth has been accompanied by a no less remarkable increase in the variety of its applications to the arts and manufactures. Accordingly, however, it was in the attempt to make this dictionary comprehensive and up-to-date, that a revised edition was found to be necessary. In order to make this reissue reasonably adequate as a presentation of contemporary knowledge, both as regards the science and its application, it was found absolutely necessary to greatly enlarge the original scope of the book. The entire contents has been carefully revised and a large part of it has been wholly rewritten. In addition to these revisions a surprising number of new and important subjects has been had to be dealt with.

The first volume of this new edition was issued in February, 1912, and the publishers hope that the entire work will be completed within two years from that time. As an indication of the thoroughness of this first volume, we might take for example, Azo coloring matters. The amount of space devoted to this one interesting subject comprises approximately 38 pages. Twelve pages are devoted to the discussion of methods and other explanation under the general heading of bleaching. The subject of acetic acid and its derivities include about 11 pages. Alizarin and allied coloring matters are described to the extent of 17 pages. Over 100 pages are devoted to the general subject of analysis, or the separating of a complex material into its simplest constituents. Barium, the well-known weighting material and its derivities, receive approximately ten pages. Cellulose, with its formations and uses is discussed to the extent of 12 pages. Another interesting subject which may be mentioned is that of "Chemical Affinity." This first volume contains 758 pages, the larger part of which is of great immediate interest to the textile chemist.

In regard to the authenticity of the articles and discussions, we have only to glance at the list of well known men who assisted the editor in the revision and compilation of the subject matter of many of the articles to at once realize the great care and the immense amount of work and research that has been devoted to the preparation of this enlarged edition. Among these are to be found Dr. W. N. Haworth; Dr. H. F. Harwood, M.Sc.; Dr. P. W. Robertson, M.A., M.Sc.; Dr Arthur Clayton;

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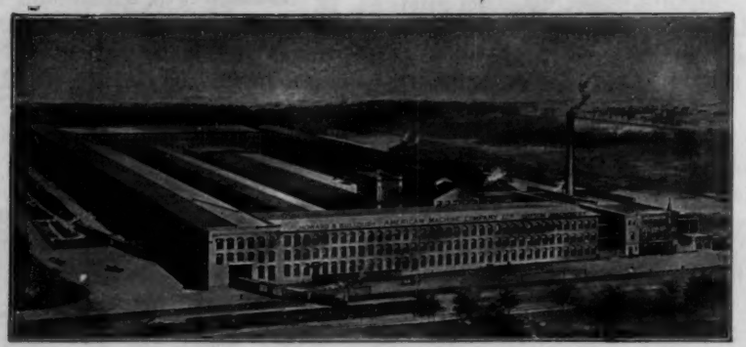

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Moreover, the contributors on special subjects to these volumes embrace the names of many notable and well known chemists and investigators. Following is a list of the contributors to Volume 1.

Dr. E. F. Armstrong. Dr. G. H. Bailey. G. S. Blake, Esq., A.R.S.M. Bertram Blount, Esq., F.I.C., *Analytical and Consulting Chemist, London.* Harold Brown, Esq., *The Imperial Institute. London.* Dr. J. C. Cain, *Editor of the Journal of the Chemical Society, London.* W. H. Coleman, Esq., *Tar Works Chemist.* Dr. Harold G. Coleman, F.I.C., *Consulting and Analytical Chemist, London.* James Connah, Esq., B.A., B.Sc., F.I.C, *The Government Laboratory, Custom House, London.* C. F. Cross, Esq., B.Sc., F.I.C., (*Messrs. Cross and Bevan, Consulting Chemists, London*). (*The late*) Dr. W. Dittmar, F.R.S., *Professor of Chemistry in Anderson's College, Glasgow.* Thomas Fairley, Esq., F.I.C., *Analytical and Consulting Chemist, Leeds.* John Golding, Esq., F.I.C., *The Midland Agricultural and Dairy College, Kingston, Derby.* Dr. A. D. Hall, M.A., F.R.S., *Rothamsted Experimental Station, Harpenden, Herts.* Dr. W. D. Halliburton, F.R.C.P., M.R.C.S., F.R.S., *Professor of Physiology, King's College, London.* John Heron, Esq., B. E. (R.U.I.) F.I.C., *Consulting Chemist, London.* Dr. John T. Hewitt, M.A., F.R.S., *Professor of Chemistry in the East London College* J. W. Hinchley, Esq., A.R.S.M., *Lecturer on Chemical Engineering, Imperial College of Science and Technology, South Kensington.* John Holmes, Esq., *The Government Laboratory, London.* Dr. Julius Hubner, M. Sc., F.I.C., *Director of Dyeing and Papermaking Departments, Municipal School of Technology, Manchester.* H. W. Hutchin, Esq., (*The Cornish Consolidated Tin Mines, Camborne*). Herbert Ingle, Esq., B.Sc., F.I.C., *late Chief Chemist to the Transvaal Agricultural Department.* Dr. Rudolph Lessing, *Consulting Chemist London.* Vivian B. Lewes, Esq., F.I.C., *Professor of Chemistry in the Royal Naval College, Greenwich, S. E.* Dr. Julius Lewkowitsch, M.A., F.I.C., *Consulting and Analytical Chmeist, London.* C. A. Mitchell, Esq. Dr. Gilbert T. Morgan, A.R.C.S., F.I.C., *Assistant Professor of Chemistry, Imperial College of Science and Technology, South Kensington.* L. Myddleton Nash, Esq., F.I.C. B. E. R. Newlands, Esq., F.I.C. (*Messrs. Newlands Brothers, Analytical Chemists, London*). A. G. Perkins, Esq., F.R.S., F.I.C., *Clothworkers Research Laboratory, University of Leeds.* Dr. F. Mollwo Perkin, *Consulting Chemist, London.* Professor W. H. Perkin, LL.D., F.R.S., and Dr. Robert Robinson, *Chemical Department, University of Manchester.* Dr. J. C. Philip, M.A., *Assistant Professor and Lecturer on Physical Chemistry Imperial College of Science and Technology, South Kensington.* J. A. Pickard, Esq., B.Sc., A.R.C.S. Dr. Henry Robinson, M.A. Dr. Thomas K. Rose. Dr. Walter Rosenhain, *The National Physical Laboratory, Teddington.* Dr. F. W. Rudler, I.S.O., *late of the Museum of Economic Geology. Jermyn St., London.* Dr. Robert Schupphaus, *Consulting Chemist, New York.* Dr. Alfred Senier, F.I.C., *Professor of Chemistry, University College Galway.* L. J. Spencer, Esq., M.A., *Mineralogical Department, British Museum, London.* George Stubbs, Esq., F.I.C., *The Government Lab-*

oratory, London. Edward R. Taylor, Esq., *Manufacturing Chemist, Penn Yan, N. Y., America.* Miss Beatrice Thomas, M.A., *Girton College Cambridge.* Dr. M. A. Whiteley, A. R.C.S., *Demonstrator in Chemistry, Imperial College of Science and Technology, South Kensington.* Geheimrat Professor Dr. Otto N. Witt, *Polytechnic. Charlottenburg, Berlin.* Dr. W. P. Wynne, F.R.S., F.I.C., A.R.C.S., *Firth Professor of Chemistry, University of Sheffield.*

THE PRINCIPLES AND PRACTICE OF TEXTILE PRINTING. By Edmund Knecht, Ph.D., F.I.C., and James B. Fothergill, technical chemist and colorist. 615 pages. 13 plates printed on extra heavy special paper. 80 illustrations in the text. 88 patterns represented by actual samples pasted in the book. Published by J. B. Lippincott Co., Philadelphia. Price, $10.50 net.

During the past few years several of the color manufacturers have issued to their customers some excellent literature on textile printing, but it is only natural that the information which these publications contain is more or less strongly biased in favor of the special products of the particular firm from which it has eminated. In preparing this book on the principles and practice of textile printing, the authors have tried to prepare a text book that would be an impartially written, modern work on textile printing. Most of the processes described are taken from actual practice and where it has been deemed desirable a printed pattern has been introduced to illustrate the effect obtained.

Many machines and processes are illustrated by special folding plates inserted in the book and a number of these are printed in two colors which makes the method described very plain and easily understood. While this is an expensive way of preparing these plates, the publishers are to be congratulated on adopting this plan, because of the greater clearness obtained.

In an introduction, the historical and general consideration of textile printing are considered. Then the authors take up the subject of methods of printing which they discuss very fully. Chapter 3 is devoted to the preparation of the cloth for printing and includes a discussion of the bleaching process and the necessary finishing and preparation. In Chapter 4 is taken up the preparation of colors for printing and the art of the color mixer is carefully explained. After printing it is necessary to give textiles some after treatment, such as ageing, steaming, fixing, discharging, washing, soaping or some similar process, and these processes are dwelt on in detail in Chapter 5. In Chapter 6, the question of mordants is carefully considered, together with various oxidizing and reducing agents.

Under the head of styles of printing in Chapter 7, comes a lengthy discussion on colors and styles. First is taken up the direct printed styles, showing the application of mordant colors; the application of the natural or vegetable dyestuffs; the application of basic colors; indigo printing; and the application of other dyestuffs. In the second style which is known as the dyed styles; the madder style, alkaline reds, dyed madder colors and steam colors; the chrome mordant style; and other processes including turkey red and indigo with the various indigo vat processes are discussed. The third style described consists of the insoluble azo colors; while under the head of the fourth style comes discharge and reserve styles. The discharge styles are treated very fully, nearly 70 pages being given to this work. The reserve styles show azo color resists under indigo; multiple resists under steam colors; and a number of resist effects under insoluble azo colors produced on the fiber. These resist effects are discussed through nearly 50 pages of matter. Under style 6 is what is known as "raised" styles. These include chrome yellow and orange; manganese bronze; chrome green; prussian blue; and "raised" vegetable colors. The printing of linings with paste colors is discussed under style 7, and metal printing under style 8. Under the head of style 9 comes the crepon or "crimp" style, which shows the direct process of crimping; the resist methods, and the aniline black resist style in crepons.

Under Chapter 8 is taken up the subject of finishing printed calico, which includes the stiffening, drying and calendering. In Chapter 9 wool printing is discussed, while in Chapter 10 silk and half silk printing is taken up. At the back of the book there are table comparisons of thermometers; hydrometer tables; weights and measures, and a price list of drugs. The book is very thoroughly indexed and is in every way a splendid treatise on textile printing.

TEXTILE DESIGN AND COLOR. By William Watson, of the Royal Technical College, Glasgow, Scotland. 360 pages. 413 illustrations. Fully indexed. Price $2.50 net. Published by Longmans, Green & Co., London, New York, Bombay and Calcutta.

Readers of COTTON will no doubt remember the interesting articles prepared for its pages on pile weaving and designing, by the author of this book. Consequently they will be better prepared to appreciate just what this book contains. This book is an exhaustive treatise on the designing and coloring of textile fabrics, but treats principally with the elementary weaves and figured fabrics. The fact that many mills in the South are at the present time becoming interested in fancy weaves of various kinds, makes a book of this nature all the more important to overseers of weaving, designers and superintendents of such mills. In the pages of this book the author illustrates and describes the construction and combination of simple and special weaves; the structure of standard classes of cloths; the theory of color, and the application of color to textile fabrics.

The designing of ordinary figured fabrics, to which eight chapters are devoted, forms a very important section of the work. Textile calculations and the principles and limitations of weaving machinery, so far as they concern woven design, are fully dealt with. As noted above, the illustrations form a distinct feature in both number and quality, and while there are 413 figures as indicated, these figures include over 1,800 different designs, diagrams, and representations of woven fabrics.

The chapters on color and its application to textiles offer much new matter, or matter presented in a new light, and will be welcomed by all who are interested in this branch of the subject. The best part of the book, however, deals with the application of design to the simpler styles of fabrics, chiefly those composed of one series of warp and one series of weft threads; this work is exceptionally well done.

THE STORY OF TEXTILES. By Perry Walton. Compiled and written for John S. Lawrence, of Lawrence & Co., 89 Franklin Street, Boston, Mass.

The purpose of this book has been to present to those interested in the textile industry a bird's-eye view of the leading facts which have brought the progress of the indus-

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TRADE B MARK

try up to the firm establishment of the manufacture of textiles on American soil, together with such intervening facts as are necessary to give one a comprehensive view of the subject. John S. Lawrence, for whom this book was prepared and by whom it is published, is a partner of the firm of LAWRENCE & Co.. one of the largest commission houses for the distribution of textile products in America. It contains 275 pages and 48 full page illustrations. It is printed on a special quality of hand-made paper with deckle edges and with special heavy plate paper insert pages for the illustrations. It has a very complete index. The work shows the result of careful and studious research; it traces weaving to the Stone Age; touches the history of the ancient people and processes, and refers to practically every subject that has inspired mankind since the world began. The textile industry, so closely interwoven with the development of this great country, takes on an added glory in the light thrown by "The Story of Textiles" on the part it has played in the history of the nation.

The limited edition of this book is being sent out by Mr. Lawrence among his friends and in the form of presentation copies with the compliments of the season.

TRADE MARKS. TRADE NAMES. A little book for the business man. 41 pages. Price 25 cents. Published by Munn & Co., 361 Broadway, New York City.

The purpose of this little book is to present in the simplest manner an interpretation of the federal statutes concerning trade mark registration and protection. Intended as it is for business men, legal phraseology has been avoided as much as possible, as well as long quotations from court decisions.

LIGHT, ITS USE AND MISUSE. A primer on light and illumination which was published by the Illuminating Engineering Society, 29 West 39th Street, New York, has already gone into a second edition. Written in a clear and comprehensive manner for popular reading, this little pamphlet has met with immediate favor. It has occasioned considerable complimentary criticism from people who are generally supposed to have little or no interest in the subject of lighting. From the heads of engineering and physics departments of schools and colleges the society has received numerous letters of commendation together with requests for quantities of the primer for distribution to students. Architects, engineers, oculists, merchants and others have also expressed their appreciation of the publication. Several lighting companies are planning to issue it to their customers. One large manufacturing company in London has cabled for permission to print and distribute a large edition in Europe. It is not unlikely that the primer will go into many editions.

DOCKHAM'S REPORT AND DIRECTORY OF CLOTHING MANUFACTURE AND CUTTING-UP TRADE. 389 pages. 8th edition. Published by the Dockham Publishing Co., 6 Beacon St., Boston, Mass. Price, express paid, $6.00.

This interesting directory contains lists covering both the United States and Canada of manufacturers of clothing and furnishings of various kinds; jobbers in coats and suits, clothing, dry goods, gloves, hosiery and other knit goods; men's furnishings; millinery, etc.; converters of cotton goods, etc.; converters of cotton goods; department stores; and New York offices. The information concerning manufacturing plants is as follows: name of company; kind of goods made; number of sewing machines; power used; if they have a laundry; post office address; location of plant; and branches. This report contains authentic information concerning 20,000 buyers.

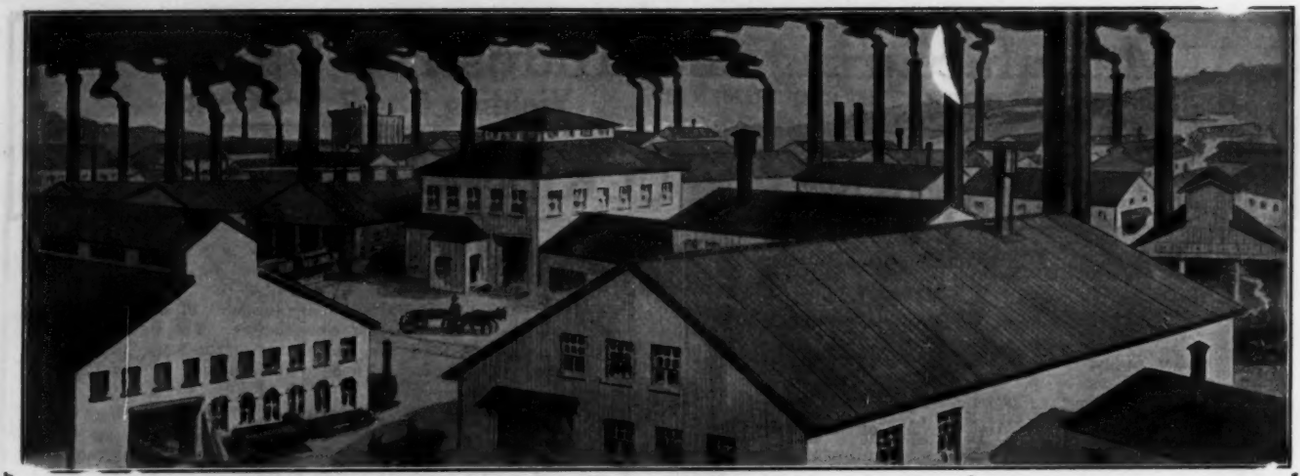
THE MODOC CO., INC., of Fernwood, Pa., manufacturers of Modoc sizings and softeners, call attention to their soap powder and scouring powder. Since March, 1912, this progressive concern has been supplying on contract the soap and scouring powder to clean all the numerous public buildings at Washington, D. C. In addition to the foregoing contract and beginning the first of this year the U. S. navy will use Modoc soap powder, the Modoc Company having been awarded the contract, although sixteen other makes of soap powder were offered to the department. This concern has a line of special soap powders and scouring powers for mill use, and the large volume of their business enables them to quote, quality considered, most advantageous prices.

THE FARBENFABRIKEN OF ELBERFELD CO., 117 Hudson St., New York City, are sending to the trade some new color cards entitled Katigen Indigo C.L.B. Extra Conc.; Pera Indigo Blue 2 R Extra; Benzoform Red 2 G F.; and Benzoform Yellow R. These color cards will be forwarded to those interested upon request.

THE STEEL HEDDLE MFG. CO., of 2100-2118 Allegheny Ave., Philadelphia, Pa., are sending out an interesting mailing card entitled "Some Heddlewise Facts for the Otherwise Man." The manufacturers claim that it will last at least eight times as long as the finest cotton wire harness and that the operative's hand or the entering hook being shoved through the harness has no effect upon the steel heddle. It will bend to admit the hand or any other heavy object, but the moment the object is removed the heddles spring back to place. These heddles are manufactured to handle from the finest to the heaviest goods and from the daintiest to the coarsest. The makers invite inquiries for samples of heddles and other information.

P. J. RILEY & CO., 48 Summer St., Lowell, Mass., are calling attention to their large, well-equipped mill constructed buildings and first-class railroad facilities, whereby they are able to store bulk freight at very low rates. They also furnish storage and insurance on cotton, cotton cloth, wool, hay, grain and all kinds of similar material. Located as they are in the heart of the cotton manufacturing district of Lowell, they are in a position to handle "off grades" of cotton to good advantage. They also deal in cotton, cotton and wool waste, cloth, etc., and shippers storing cotton, wool and similar materials with them will get the benefit of their efforts in disposing of same to the manufacturers in that section. Rates and other information will be furnished on application.

BOSSON & LANE, of Atlantic, Mass., is sending out an interesting little booklet under the heading "The Modern Method," in which they describe the proper method to use to obtain successful bleaching when using their bleaching oil or their soda carbon olate. This booklet contains a number of rules and suggestions that are of great interest to bleachers; such as the removal of kier stains; bleaching goods containing colors; boiling of raw cotton; taking out oil stains; neutralizing chlorine; counteracting the effect of



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iron in the water; and other like points of interest for the bleacher. This booklet also contains a comparative hydrometer scale showing specific gravity in Beaume and Twaddel.

CASELLA COLOR CO., 182 Front St., New York City, are sending to the trade a new color chart entitled Hydron Yellow G Paste 20 per cent, which contains samples of the hydron yellow and also hydron yellow in a combination of yellow and blue with the resulting green shade. This color card also contains directions for dyeing, printing, etc. It will be forwarded on request.

The asphalt production of Texas, which is principally residue from heavy asphaltic oils, according to the United States Geological Survey, amounted to 57,713 short tons, valued at $1,040,825, in 1910, and 55,826 tons, valued at $786,785, in 1911.

California was the largest producer of petroleum, asphalt, borax, gems and precious stones, magnesite, quicksilver, and platinum in 1911, according to the United States Geological Survey. The State was also the largest producer of gold.

MILL NEWS

Notices of mill projects, additions or Improvements are solicited for this department

ALABAMA.

FORENCE. It is locally reported that the Ashcraft Mills are contemplating building a large addition to their plant.

UNIONTOWN. The Canebrake Cotton Mills are building a waste house 40 x 50 feet, one story high. A machine shop and operatives houses are also to be built during the present year.

ALEXANDER CITY. The Russell Mfg. Co., are to add 5,000 spindles and other equipment to its plant.

CALIFORNIA.

LOS ANGELES. A new hosiery plant has just been started by the Whittenberg Co., which will be operated under the name of the Isis Hosiery Mill. This plant is equipped for 25 knitting machines for the manufacture of men's and women's mercerized and lisle hosiery.

CONNECTICUT.

COSCOB. The Mianus Mfg. Co. has commenced work on a new four-story mill which is a duplicate of the one just finished. They are also installing a large turbine water wheel to be used in operating electric power.

GEORGIA.

ATHENS. It is rumored that the Southern Mfg. Co., of this place, will build an additional mill of 20,000 spindles and 400 looms.

DALTON. The report some time ago of a new mill project for this place is now assured and plans are being prepared. George W. Hamilton will be the president.

SOCIAL CIRCLE. 140 looms are to be added to the Social Circle cotton mills.

WEST POINT. The Riverdale Mills are replacing five speeder frames with new ones. These mills manufacture duck.

ATLANTA. It is rumored that a new cotton mill is to be located in either Preston or Hagan and that there has already been subscribed $250,000. This mill will make a specialty of Sea Island cotton yarn, but the mill will also be built with the view to the manufacture of short staple cotton. This is probably the same mill about which rumors were printed last month in connection with a mill to be located near Savannah.

MACON. The new 18,000 spindle yarn mill of the Bibb Mfg. Co., at this place is now under construction. The Gery-Wimmer Construction Co., of St. Louis, has charge of the work. This mill will be electrically driven with current furnished by the Central Georgia Power Co.

ILLINOIS.

CHESTER. The capital stock of the Chester Knitting Mills has been increased to $200,000. The product of the plant consists of men and misses seamless cotton hosiery.

MASSACHUSETTS.

NEEDHAM The addition to the mill at Highland Ave., for the William E. Carter Co., is being built. It is to be of brick, fireproof, 100 by 36 feet, three stories.

SOUTH FRAMINGTON. Contract for the erection of a new mill building in this place for the Standard Woven Fabric Co., has been let. The building will be three stories and basement of brick, steel and concrete.

MISSISSIPPI.

WATER VALLEY. The Okono Mills are building a dye house and winding room to be used in the manufacture of sea island twine and carpet warps.

YAZOO CITY. The Yazoo City Yarn Mills are adding 1,500 spindles and Foster winders. Also new boilers, condensers, pumps, etc., for their power plant.

McCOMB CITY. The Delta Mills are running overtime in some of their departments.

NEW JERSEY.

UNION. The Atlas Knitting Mills has been granted a charter to manufacture knit goods and is capitalized at $15,000.

NEW YORK.

OSWEGO. The Oswego Textile Co., has been incorporated with a capital of $25,000.

NORTH CAROLINA.

FRANKLINTON. The Sterling Cotton Mill is building an annex almost twice as large as the original mill. Part of it is two stories high and part of it three stories high and the ground plan measures 483 by 107 feet.

GASTONIA. The additions are being built to the Flint Mill at Gastonia.

LYDIA. The Lydia Mfg. Co., has been chartered with a capitalization of $30,000, and it is understood that they are to manufacture textile fabrics. C. D. Lee is the president and secretary.

HIGH POINT. The Highland Cotton Mills has been chartered with a capital of $250,000 authorized and $100,000 already subscribed. A number of prominent citizens are interested in this mill.

LUMBERTON. The Lumberton Cotton Mills are to change the entire mills to electric drive.

PENNSYLVANIA.

PHILADELPHIA. The Lehigh Spinning Co., has been incorporated with a capital stock of $100,000.

HONESDALE. The Katz Underwear Co., has been incorporated with a capital of $100,000.

SOUTH CAROLINA.

BLACKSBURG. The Broad River Mills, which were recently incorporated, is a reorganization of the old Whitaker Cotton Mills which has been recently taken over by Gaffney parties.

MAYESVILLE. The Mayesville Cotton Mills, which were recently incorporated, have been organized with E. L. Mattock as president; J. E. Brown, secretary; and R. L. Jenkins, treasurer. The building will cost approximately $50,000 and 5,000 spindles will be installed, driven by electric power.

INMAN. The Inman Mills are considering the installation of automatic looms in place of the present plain type.

CHARLESTON. It is rumored that the old Royal Mills at this place will soon start up.

TENNESSEE.

KNOXVILLE. The Brookside Mills have recently increased the capitalization to $1,200,000.

WISCONSIN.

NEENAH. The Jersild Knitting Co., is building a new mill on modern plans. When completed it is to be thoroughly equipped with Swiss knitting machinery.

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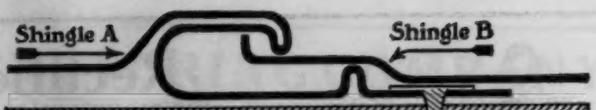

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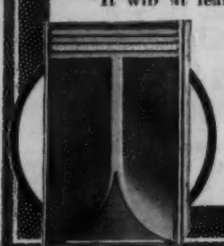

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ALPHABETICAL INDEX TO ADVERTISERS

Acme Knitting Machine & Needle Co. 17
Acme Steel Goods Co. 13
Alabama Engraving Co. 22
Allis-Chalmers Co. 166
American Audit Co. 15
American Bond & Mortgage Co. 23
American Dyewood Co. .....
American Laundry Mch. Co... 174
American Machine Co..... 143
American Mfg. Co. 163
American Moistening Co..... 28
American Soap & Washoline Co. 172
American Supply Co. 157
American Tool and Mach. Co. 168
Arabol Mfg. Co..... 150
Atlanta Stamp & Stencil Works 158

Bailey-Lobby Co. 164
Barber-Colman Co. 14
Barrett Mfg. Co..... 145
Barrell Co., William L..... 160
Bay State Storage & Warehouse Co. 14
Beer, H. & B. 162
Boomer & Boschert Press Co.. 19
Bosson & Lane 169
Bowser & Co., Inc., S. F. 14
Bradley Mfg. Co., A. J..... 22
Brown Paint Co., Chas. H.... 22
Bull, Wm. C. 10
Butterworth & Sons Co., H. W. 174
Buts, W. D. 13

Cameron Septic Tank Co. 162
Camp Machine Co. 154
Carpenter & Co., The Geo. P..161
Cary Mfg. Co. 23
Cassella Color Co..... 168
Central of Georgia Ry. 26
Chesapeake Belting Co..... 165
Clarage Foundry & Mfg. Co...162
Clark Co., The Geo. P..... 15
Clinchfield Fuel Co..... 155
Cocker & Co., M. 22
Cortright Metal Roofing Co...149
Crocker-Wheeler Co. 22
Crompton & Knowles Loom Works 8

Dary Ring Traveler Co..... 10

Detroit Graphite Co..... 160
Dixon Crucible Co., Jos. 164
Dixon Lubricating Saddle Co. 22
Draper Co. .....2 & 3
Dufur & Co..... 22

Eastern Chem. Co..... 172
Easton & Burnham Mch. Co.. 6
Electric Smelting & Aluminum Co. 172
Emmons Loom Harness Co....152
Entwistle Co., T. C. 6
Eureka Fire Hose Mfg. Co.... 21

Fales & Jenks Mch. Co..... 6
Farbenfabriken of Elberfeld Co. 168
Farbwerke-Hoechst Co. 153
Fawcett, Hughes 160
Felton & Son Co., S. A..... 12
Felton Brush Co., D. D. 22
Foster Engineering Co..... 165
Foster Machine Co..... 176

Garland Mfg. Co..... 28
Geisenheimer & Co..... 168
General Electric Co..... 27
Glenlyon Dye Works..... 160
Glidden Varnish Co., The.....163
Graphite Lubricating Co..... 165
Graton & Knight Mfg. Co..... 28
Graves Co., Frank B..... 158
Grinnell, Willis & Co..... 158
Hardy, Frank A..... 176
Hart, Charles 19
Henderson & Co., Chas. F.....160
Hess Bright Mfg. Co..... 25
Hill, Nicholas S., Jr..... 162
Hoffman, Geo. W..... 176
Hooker Electro-Chemical Co.. 28
Hotel Rittenhouse 154
The St. Charles 9
Hotel Tuller 172
Hotel Victoria 172
Hotel York 152
Howard & Bullough, American Machine Co. 143
Howard Clock Co., E..... 176
Howard Dustless Duster Co... 14
Howard & Morse..... 166
Hungerford & Terry, Inc.....169
Hussa, Theo F. 21
Hussong Dyeing Machine Co..174
Hyatt Roller Bearing Co..... 21
Hydraulic Press Mfg. Co..... 19

International Cotton Mills Corp. 161

Jenckes Knitting Mach. Co... 17

Kalle & Co., Inc. 169
Kellogg & Co., E. H. 12
Kemp Mfg. Co., C. M. 128
Kilburn, Lincoln & Co..... 10
Klipstein & Co., A. 170
Leigh & Butler 10
Lestershire Spool & Mfg. Co.. 10
Lolman Bros. Co..... 20
Lindley, Geo. W..... 10
Lindsay, Hyde & Co. 10
Lippincott, A. C. 164
Logemann Bros. Co..... 149
Lombard Iron Works & S. Co. 166
Lorimer's Sons Co., Wm. H. 158

Matthews, J. Merritt, Ph. D...162
Mason Machine Works 5
Mayes, J. H. 6
Mayo Mach. Co., Geo. D..... 12
Merrow Machine Co..... 15
Metallic Drawing Roll Co..... 5
Mill News Printing Co..... 17
Modoc Co. 169
Morris Machine Works.....167
Morris & Co. 172

N. Y. and N. J. Lubricant Co.165
Nason Mfg. Co. 167
National Hotel 13
The New Ebbitt..... 13
Northeastern Co. 28
Norwood Engineering Co. 170
Nye & Tredick Co. 15

Oneida Steel Pulley Co.....168

Palmer Co., I. E. 12
Parker, B. M. 149
Paulson, Linkroum & Co....160
Pearson, Jos. T. 9
Pa Oil Soap & Chemical Co..157
Pettes & Randall Co. 22
Phila. Drying Mch. Co.....176
Phila. Textile Mchy. Co.....173
Phila. Yarn Co. 159
Potter & Johnson Mch. Co... 6
Powell Co., William.....165
Power Specialty Co. 167
Fsarski Dyeing Mach. Co.....175
Putnam Hooker Co. 160

Reliance Machine Works 19
Richards, Atkinson & Haserick 150
Richardson Bros. 14
Riley Co., C. E. 158
Riley & Co., P. J. 172

Saco-Lowell Shops 11
Salkeld & Bros., A. D. 160
Sargent's Sons Corp., C. G....173
Sayward, Henry E. 150
Scaife & Sons Co., Wm. B. ..171
Schnitzler, Chas. H. 22
Schofield's Sons, J. S. 166
Schofield Co., Wm. 14
Scholes, John 10
Schoellkopf, Hartford & Hanna Co. 149
Scholler Bros. Co..... 160
Scott & Williams, Inc. 12
Seydel Mfg. Co. 154
Seymour, J. M., Jr..... 12
Shoreham Hotel 28
Shambow Shuttle Co..... 13
Sirrine, J. E. 162
Solvay Process Co. 171
Southern Cotton Mills & Commission Co. 159
Southern Engineer 156
Southern Engraving Co.....150
Spiker, W. C. 162
Stafford & Holt 17
Stafford Co. 7
Stafford & Co., G. A. 158
Standard Bleachery Co.....171
Standard Crayon Mfg. Co.... 22
Standard Paint Co..... 147
Steel Heddle Mfg. Co. 151
Stevens, Manuel J. 154
Stewart & Sons 10
Stuart Howland Co..... 159
Sykes & Co., Walter F. 171

Taylor, James 157
Textile Finishing Mchy. Co...175
Thurston & Son, A. G. 9
Tolar & Hart 160
Tolhurst Machine Works.....175
Toomey, Frank 157
Turner, Tucker & Co. 148
Turner Co., J. Spencer 161

U. S. Gutta Percha Paint Co.. 18
U. S. Hoffman Co.....
UniversalUniversal Winding Co. .....Front Cover

Walsh & Weidner Boiler Co..164
Weller, Francis R. 162
Weimar Bros. 159
Wedderburn, Alex J. 160
Westinghouse El. & Mfg. Co.. 24
Westinghouse Machine Co.... 24
Whitinsville Spinning Ring Co. 9
Whitin Machine Works 4
Whiton Machine Co., D. E...167
Wildman Mfg. Co..... 16
I. B. Williams & Sons 26
Willis & Co., Grinnell 158
Woodward, Baldwin & Co....159
Woonsocket Mch. & Press Co. 6

Zurn Co., O. F. 176

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Philadelphia Drying Machy. Co.
Textile Finishing Machinery Co., The
Tolhurst Machine Works.

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Seydel Mfg. Co.
Solvey Process Co., The

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Sargents Sons & Co., C. G.
Textile Finishing Machinery Co., The

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Mason Machine Wks.
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Textile Finishing Machinery Co., The

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Sykes & Co., Walter F.

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Putnam, Hooker & Co.
Quilhot & Son, S.
Riley Co., C. H.
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Phila. Drying Machy. Co.
Phila. Textile Mchy. Co.
Schnitzler, Chas. H.

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Carpenter & Co., Geo. B .

Cordage Machinery.
Saco-Lowell Shops.
Textile Finishing Machinery Co., The

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Henderson & Co., Chas. F.
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Phila. Textile Mchy. Co.
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Taylor, James.
Toomey, Frank.
Textile Finishing Machinery Co., The
Whitin Machine Wks.
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Modoc Co., The
Penna. Oil, Soap & Chem. Co.
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Zurn Co., The O. F.

Cotton Waste Machinery.
Howard & Bullough.
Kitson Machine Shop.
Sargent's Sons Corp., C. G.
Schofield Co., Wm.

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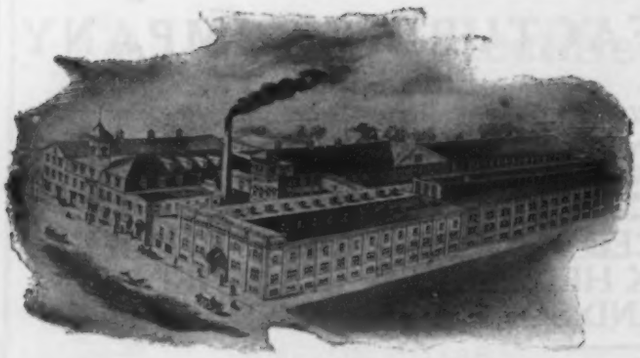

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Butterworth & Sons Co., H. W.
Philadelphia Drying Machy. Co.
Philadelphia Textile Machy. Co.
Sargent's Sons Corp., C. G.
Textile Finishing Machinery Co., The

Duck.
Barrell Co., Wm. L.
Carpenter & Co., Geo. B.
International Cotton Mills Corporation.
J. Spencer Turner.

Duck Baskets.
Morris & Co.

Dust Collectors.
Phila. Drying Machy. Co.

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Glenlyon Dye Works.
Standard Bleachery Co.

Dyeing, Bleaching and Finishing Machinery.
Butterworth & Sons, H. W.
Hussong Dyeing Machine Co.
Lorimer's Sons Co., W. H.
Phila. Drying Machy. Co.
Phila. Textile Machy. Co.
Psarski Dyeing Machine Co.
Textile Finishing Machinery Co., The
Tolhurst Machine Works.

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American Dyewood Co.
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Walsh & Weidner Boiler Co.

Engineers, Consulting.
Cameron Septic Tank Co.
Saco-Lowell Shops.
Sirrine, J. E.
Spiker, Wm. C.
Weller, Frances R.

Engines.
Lombard Iron Works & Sup. Co.
Morris Mch. Works.
Schofield's Sons Co., J. S.
Toomey, Frank.
Walsh & Weidner Boiler Co.

Engravers.
Alabama Engraving Co.
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Extractors—Hydro.
American Tool & Mch. Co.
Tolhurst Machine Works.

Fans—Power.
Clarage Fdry. & Mch. Co.
General Electric Co.
Howard & Morse.
Phila. Drying Machy. Co.
Phila. Textile Machy. Co.
Seymour, J. M.
Westinghouse Electric & Mfg Co.

Fans—Exhaust.
Clark Co., The Geo. P.
Howard & Morse.
Phila. Drying Machinery Co
Phila. Textile Machinery Co.
Tolhurst Machine Works.

Feed Water Heaters.
Nason Mfg. Co.

Feed Water Heater Purifiers.
Scaife & Sons Co., Wm. B.

Filters.
Hungerforth & Terry.
Scaife & Sons Co., Wm. B.

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Flosses.
Richardson Bros.

Fluted Rolls.
Howard & Bullough.
Metallic Drawing Roll Co.
Schofield & Co., Wm.

Flyers.
Howard & Bullough.
Saco-Lowell Shops.
Thurston & Sons, A. G.

Frames.
Steel Heddle Mfg. Co.

Fuel.
Clinchfield Fuel Co.

Gaskets.
Power Specialty Co.

Gauge Cocks.
Foster Engineering Co.
Nason Mfg. Co.
Powell Co., Wm.

Gear Cutting Machines.
Whiton Mch. Co., The D. E.

Harness—Loom.
Crompton & Knowles Loom Works.
American Supply Co.
Emmons Loom Harness Co.
Garland Mfg. Co.
Scholes, John.

Heating and Ventilating Apparatus.
Phila. Drying Machinery Co.
Phila. Textile Machinery Co.

Heddles.
Crompton & Knowles Loom Works.
Draper Co.
Steel Heddle Mfg. Co.

Heddle Frames.
Crompton & Knowles Loom Works.

Humidifying Apparatus.
American Moistening Co.

Hydro Extractors.
American Laundry Mchy. Co.
American Tool & Mach. Co.
Tolhurst Machine Works.

Indicators.
Lippincott, A. C.

Investment Securities.
American Bond & Mortgage Co.
Turner, Tucker & Co.

Jacquards.
Crompton & Knowles Loom Works.
Kilburn, Lincoln & Co.

Kiers.
Butterworth & Sons Co., H. W.

Knit Goods Washers.
Phila. Drying Machinery Co.
Phila. Textile Machinery Co.
Textile Finishing Machinery Co.

Knitting Machinery.
Acme Knitting Machine & Needle Co.
Jenkes Knitting Mach. Co
Lindley, Geo. W.
Taylor, Jas.
Mayo Machine Co., Geo. D.
Nye & Tredick Co.
Scott & Williams.
Stafford & Holt.
Wildman Mfg. Co.

Knitting Machine—Double Rib.
Lindley, Geo. W.

Lace Machines.
Geo. W. Lindley.

Lamps—Incandescent and Arc.
General Electric Co.
Stuart-Howland Co.
Westinghouse Electric & Mfg. Co.

Lappers.
Potter & Johnson Mch. Co.

Laundry Machinery.
American Laundry Mchy. Co.
Bull, Wm. C.
Tolhurst Machine Works.

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317 NORTH CLARK STREET, CHICAGO, ILL.
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1418 EMPIRE BUILDING, ATLANTA, GA.
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30 ST. FRANCOIS XAVIER STREET, MONTREAL, CANADA.
28 WELLINGTON STREET, TORONTO, CANADA.

CLASSIFIED INDEX TO ADVERTISERS—Continued.

Linen Yarns.
Hughes Fawcett.

Looms.
Crompton & Knowles Loom Works.
Draper Co.
Kilburn, Lincoln & Co.
Mason Machine Shop.
Stafford & Co.
Stewart & Sons.
Whitin Machine Works.

Lubricants.
Dixon, Jos., Crucible Co.
Graphite Lubricating Co.
Kellogg & Co., E. H.
N. Y. & N. J. Lubricant Co.

Manila and Sisal Rope.
American Mfg. Co.
Carpenter & Co., Geo. B.

Mercerizers.
Lorimer Sons Co., Wm. H.
Standard Bleachery Co.

Metal Polish.
Hoffman, Geo. W.

Mill Baskets.
Hardy, F. H.
Morris & Co.

Mill Stocks.
Turner, Tucker & Co.

Mules.
Mason Machine Works.

Oils—Turkey Red.
Seydel Mfg. Co.

Oil Separators.
American Tool & Mach. Co.
Bailey-Lebby Co.

Openers for Cotton, Wool, Waste, Etc.
Schofield Co., Wm.

Ornamental Iron Work.
Dufur & Co.

Oxidizing Machinery.
Phila. Drying Machinery Co.

Packing, Metallic, Etc.
Bailey-Lebby Co.
Powers Specialty Co.

Paints.
Brown Paint Co., Chas.
Detroit Graphite Co.
Glidden Varnish o.
Standard Paint Co.
U. S. Gutta Percha Paint Co.
Wadsworth, Howland & Co.

Papers.
Richardson Bros.

Picking Machinery.
Howard & Bullough, Am. Machine Co.
Kitson Machine Shop.
Schofield Co., Wm.

Pickers—Leather.
Garland Mfg. Co.

Piece Goods Wrappers.
Richardson Bros.

Picker Sticks.
Garland Mfg. Co.

Pneumatic Conveyors.
Schnitzler, Chas. H.

Press Boards.
Richardson Bros.

Press Papers.
Phila. Drying Machinery Co.
Richardson Bros.

Presses.
Butterworth & Sons Co., H. W.
Hydraulic Press Mfg. Co.
Logemann Bros. Co.
Phila. Drying Machinery Co.
Reliance Machine Works.
Textile Finishing Machinery Co., The
U. S. Hoffman Co.
Woonsocket Machine & Press Co.

Pulleys.
Oneida Steel Pulley Co.

Pumps.
The Deming Co.
Leiman Bros.
Morris Machine Works.
Phila. Drying Machinery Co.
Textile Finishing Machinery Co., The.
Toomey, Frank.
Walsh & Weidner Boiler Co.
Seydell Mfg. Co.

Railings.
Dufur & Co.

Reeds.
American Supply Co.
Emmons Loom Harness Co.
Garland Mfg. Co.
Scholes, John.
Stewart &Sons.

Reels.
Crompton & Knowles Loom Works.
Draper Co.
Easton & Burnham Mch. Co.
Lindsay, Hyde & Co.
Saco-Lowell Shops.
Schofield Co., Wm.

Rib Top Cutters.
Wildman Mfg. Co.

Ring Travelers—Steel and Bronze.
Dary Ring Traveler Co.
Whitinsville Spinning Ring Co.

Roller Bearings.
Hyatt Roller Bearing Co.

Roofing.
Bailey-Lebby Co.
Barrett Mfg. Co.
Brown Paint Co., Chas. H.
Cortright Metal Roofing Co.
Lincoln Waterproofing Cloth Co.
Standard Paint Co.

Rope.
American Mfg. Co.
Bailey-Lebby Co.
Carpenter & Co., Geo. B.

Roving Machinery.
Howard & Bullough.
Saco-Lowell Shops.
Woonsocket Mach. & Press Co.

Saddles and Stirrups.
Dixon Lub. Saddle Co.

Second Hand Machinery.
Toomey, Frank.

Sewage Disposal.
Cameron Septic Tank Co.

Sewing Machines.
Marrow Machine Co., The

Shaft Aligning Apparatus.
Hess Bright Mfg. Co.

Sheeting.
Barrell Co., Wm. L.

Shuttles.
Crompton & Knowles Loom Works.
Draper Co.
Shambow Shuttle Co.

Singeing Machinery.
Butterworth & Sons Co., H. W.
Hussa, Teo. F.
Phila. Drying Machinery Co.
Textile Machinery Finishing Co., The.

Size Kettles.
Howard & Bullough, American Machine Co.
Textile Machinery Finishing Co., The.

Sizing and Finishing Compounds.
Arabol Mfg. Co.
Bosson & Lane.
Metz & Co., H. A.
Modoc Co., The.
Seydel Mfg. Co.

Slashers.
Butterworth & Sons Co., H. W.
Howard & Bullough, American Machine Co.
Textile Finishing Machinery Co., The.

Slubbers.
Howard & Bullough, American Machine Co.
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Classified Index to Advertisers—Continued.

Softeners—Cotton.
Arabol Mfg. Co.
Modoc Company.
Penna. Oil, Soap & Chem. Co.
Seydel Mfg. Co.
Zurn Co., The O. F.

Spindles.
Draper Company.
Easton & Burnham Mch. Co.

Spinning Machinery.
Draper Company.
Fales & Jenks Mch. Co.
Howard & Bullough, American Machine Co.
Mason Machine Co.
Whitin Machine Works.

Spinning Rings.
Draper Company.
Howard & Bullough.
Whitinsville Spinning Ring Co.
Whitin Machine Works.

Spooling Machinery.
Draper Company.
Easton & Burnham Mach. Co.
Lindsay, Hyde & Co.
Whitin Machine Works.

Spools—Metal.
Lestershire Spool & Mfg. Co.

Storage.
P. J. Riley & Co.

Steam Specialties.
Bailey-Lebby Co.
Foster Engineering Co.
Nason Mfg. Co.
Powell Co., Wm.
Power Specialty Co.

Steam Traps.
Bailey-Lebby Co.
Nason Mfg. Co.

Steam Turbines.
Allis-Chalmers Co.
General Electric Co.
Westinghouse Machine Co.

Stencils.
Atlanta Stamp & Stencil Wks.
Bradley Mfg. Co., A. J.

Stop Motion.
Wildman Mfg. Co.
Crompton & Knowles Loom Works.
Draper Company.

Superheaters.
Power Specialty Co.

Tanks and Tubs.
Bowser & Co., S. F.
Lombard Iron Works & Supply Co.
Phila. Drying Machinery Co.
Textile Finishing Machinery Co., The.
Walsh & Wiedner Boiler Co.

Tapes and Braids.
Weimar Brothers.

Telephone Systems.
Pettes & Randall Co.

Temples.
Draper Company.

Tenters.
Butterworth & Sons Co., The.
Textile Finishing Mach. Co.

Textile Papers.
Richardson Bros.

Thin Place Preventers.
Draper Company.

Thread Guides.
Palmer Co., The I. E.

Trade Mark Lawyers.
Duvall, Jr., Edward.

Transmission Rope.
American Mfg. Co.
Carpenter & Co., Geo. B.

Travelers.
Dary Ring Traveler Co.
Whitinsville Spinning Ring Co.

Trucks.
Clark Co., The Geo. P.

Twines.
Richardson Bros.

Twisting Machinery.
Draper Company.
Fales & Jenks Mch. Co.
Howard & Bullough, American Machine Co.
Leigh & Butler.
Saco-Lowell Shops.
Whitin Machine Works.

Valves—Steam, Ammonia, Water, Etc.
Bailey-Lebby Co.
Foster Engineering Co.
Nason Mfg. Co.
Powell Co., Wm.
Power Specialty Co.
Toomey, Frank.

Ventilating Fans.
Seymour, J. M.
Clarage Fdry. & Mch. Co.

Warp Tying Machines.
Barber-Coleman Co.

Warpers and Warping Machinery.
Crompton & Knowles Loom Works.
Draper Company.
Entwhistle & Co., T. C.
Howard & Bullough, American Machine Co.
Saco-Lowell Shops.

Waste Machinery.
Howard &Bullough.
Leigh & Butler.
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Sargent's Sons Co., C. G.
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Barrell Co., Wm. L.

Waterproofing Machinery.
Textile Finishing Machinery Co., The.

Water Softeners.
Hungerford & Terry.
Scaife & Sons Co., Wm. B.

Winding Machinery.
Foster Machine Co.
Howard & Bullough, American Machine Co.
Lindsay, Hyde & Co.
Taylor, Jas.
Universal Winding Co.

Wood Preservatives.
The Northeastern Co.

Woolen Machinery.
Crompton & Knowles Loom Works.
Draper Company.
Leigh & Butler.
Lindsay, Hyde & Co.
Phila. Drying Machinery Co.
Phila. Textile Machinery Co.
Sargent's Sons Co., C. G.
Schofield Co., Wm.
Textile Finishing Machinery Co., The.
Lindsay, Hyde & Co.

Wrapping Paper.
Richardson Bros.

Yarns.
Hughes Fawcett.
Lorimer's Sons Co., Wm. H.
Philadephia Yarn Co.
Riley Co., C. E.
Tolar & Hart.
Whitman & Co., Wm .

Yarns—Linen.
Hughes Fawcett.

Yarns—Turkey Red.
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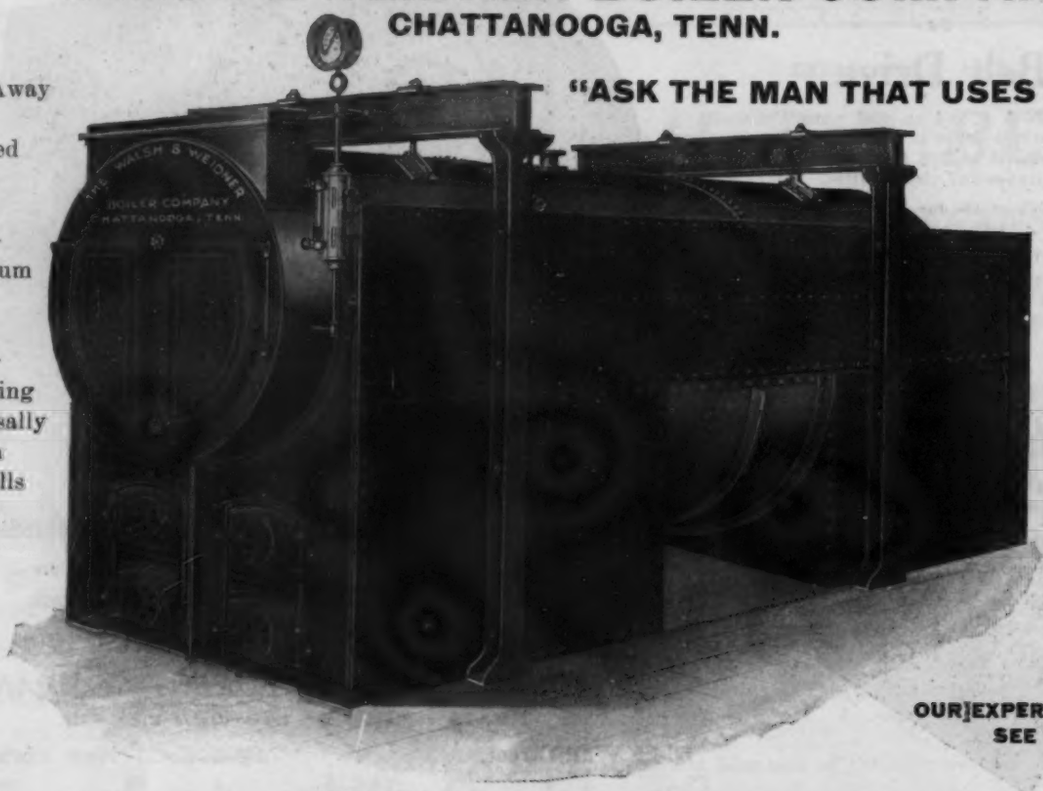

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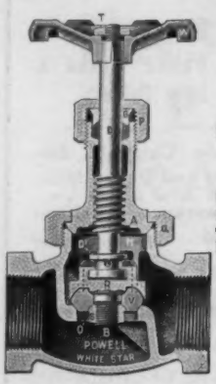

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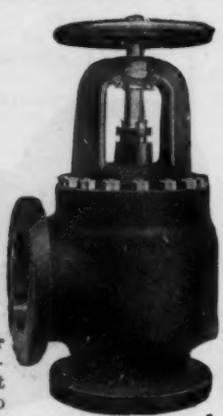

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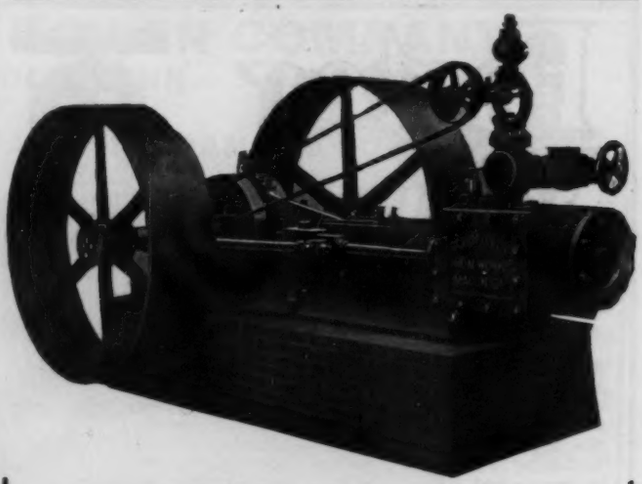

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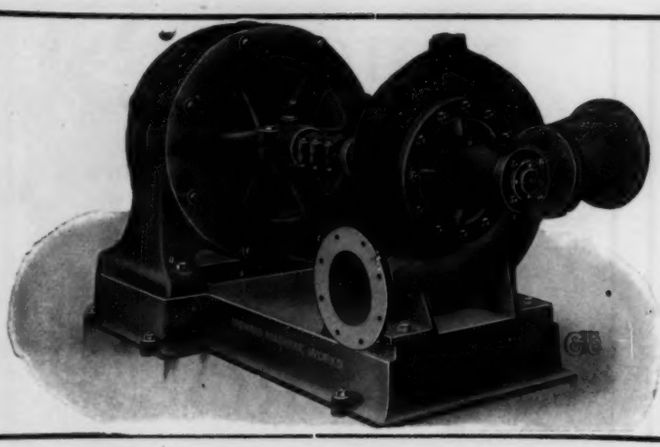

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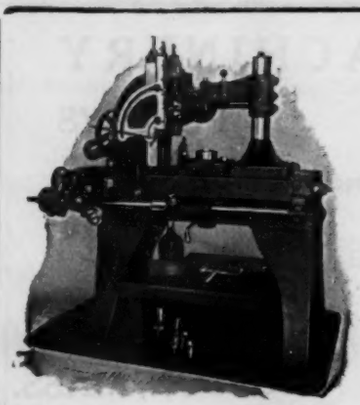

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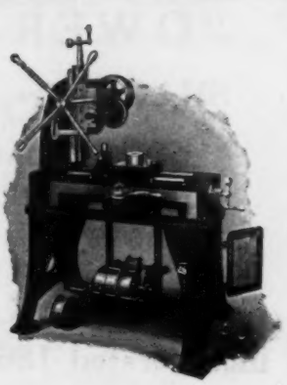

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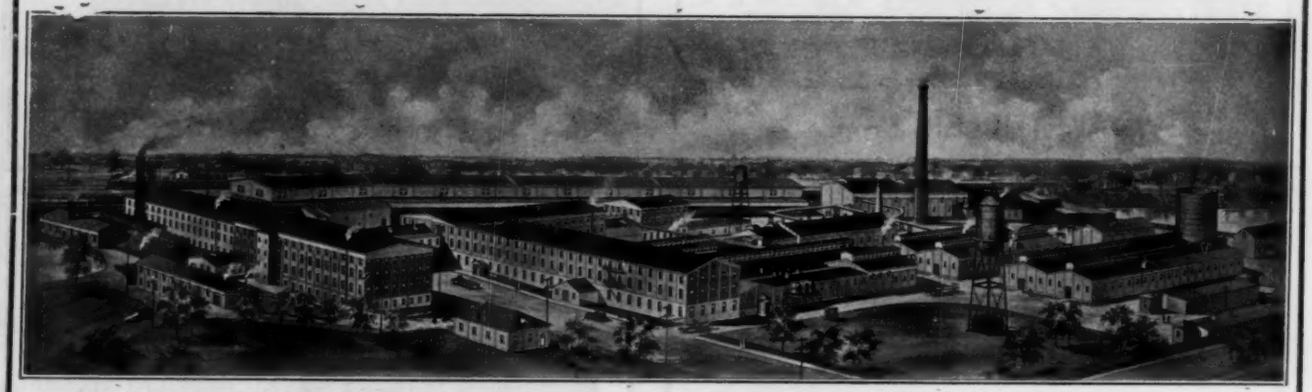

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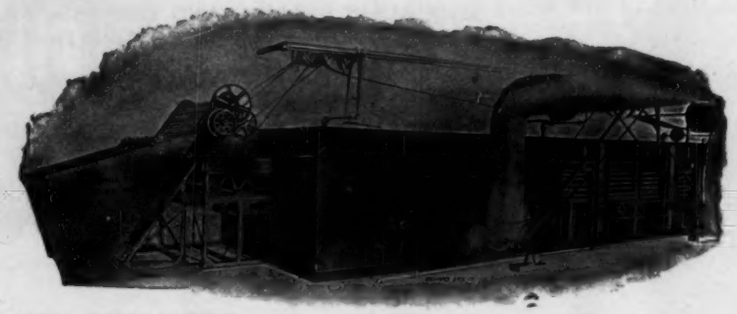

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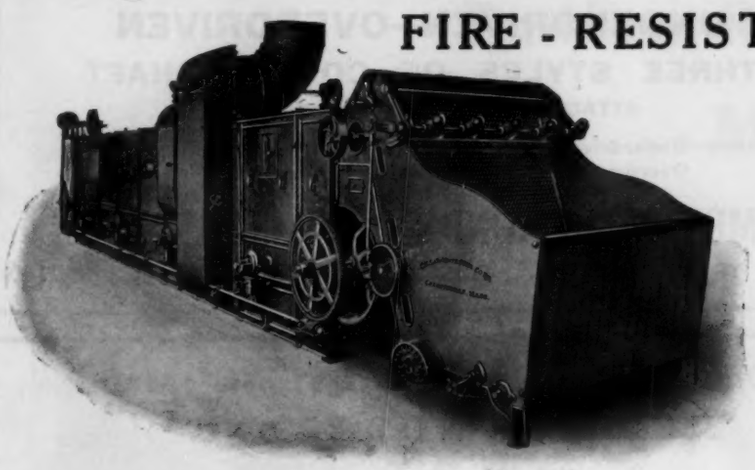

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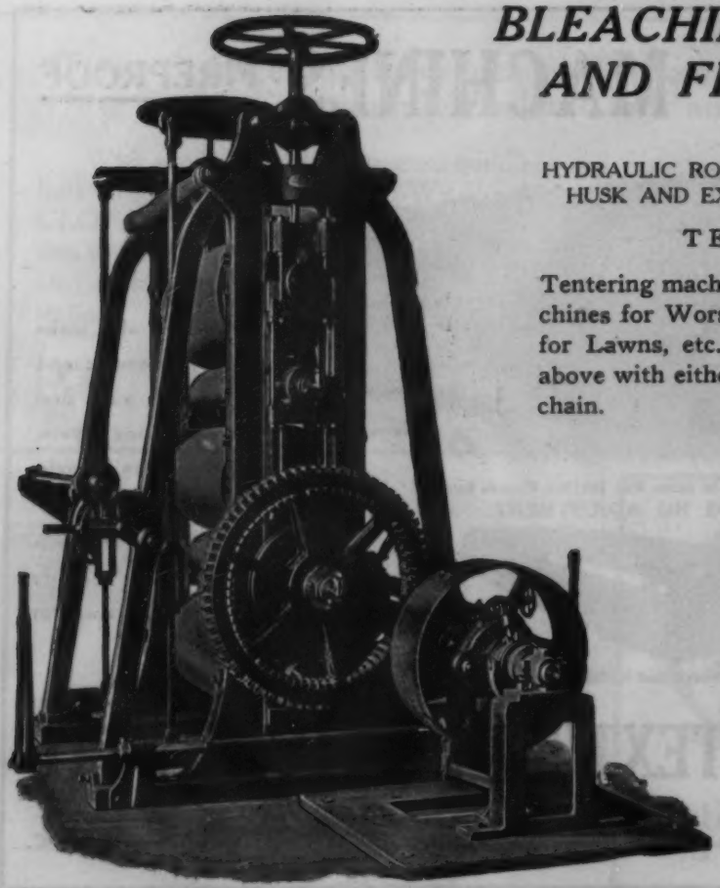

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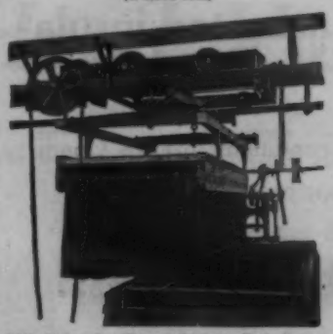


300 Pounds Yarn Suspended from Compressed Air Hoist

DOES THE COST OF DYEING AND BLEACHING INTEREST YOU?

Inform us name of the machine you favor and we will advise you who have used it in competition with the Hussong with information touching upon the comparative results.

Hussong Dyeing Machine Company

GROVEVILLE, N. J.

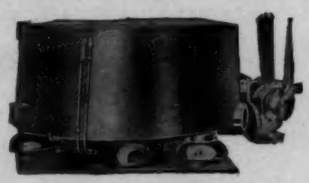
Tolhurst Self-Balancing Extractors

Belt Engine or Motor Driven

Write for Catalog Today

Over-Driven Extractor.

Belt Engine or Motor Driven



Also Direct Connected Electrically Driven

Open Top Extractor.

Tolhurst Machine Works

TROY, N. Y.

Economical Cotton Dyeing and Bleaching

In the Psarski Dyeing Machine

Saves Labor
Saves Dyes
Saves Drugs
Saves Steam
Saves Water

Saves Fibre

Sulphur—Developed—Vat Dyes
Done Equally Well

RAW STOCK DYEING—The cotton goes to cards in as good condition as directly from bales. Is not rolled into balls and strings.

BLEACHING—Bleached and washed PERFECTLY CLEAN—FREE FROM CHLORIN OR ACID. 3½ hours to batch. Is not pounded and twisted into practically waste.

SKEIN DYEING—No Boiling Out—No Tangles—Yarns are left Smooth and in perfect condition for winding, knitting, etc.

HOSIERY—Recommended size of machine does 300 pounds to batch, SULPHUR OR DEVELOPED BLACKS. It is not Roughed—No Singeing required—No Sorting—No Damaged.

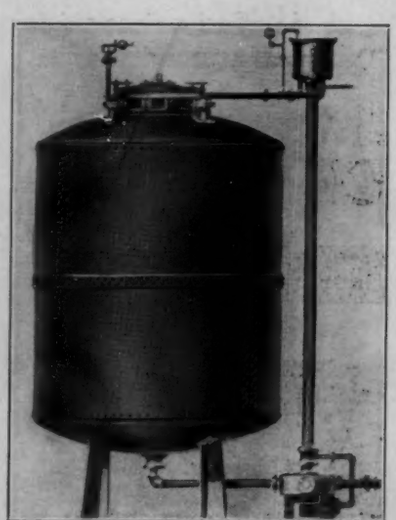
15 to 20 per cent Saving in Drugs

The Psarski Dyeing Machine Co.

3167 Fulton Road CLEVELAND, OHIO

The Textile Finishing Machinery Co.,

Providence, R. I.



Bleaching Kier fitted with Rusden patent circulator and super heater

Machinery for

Singeing
Mercerizing
Drying

Bleaching
Dyeing
Printing

and Finishing

Textile Fabrics and Warps

No. 12 Model Cone Winder.

FOSTER MACHINE COMPANY

The model 12 cone winder has many patented features that reduce winding cost and perfectly finish the spinner's product. It is, however, the simplest quick traverse machine ever built and has actually fewer parts than before the metallic tension and slub catcher, increasing taper cone or differential motion were incorporated in it.

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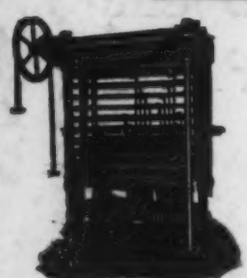

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